VETERINARY MEDICINE

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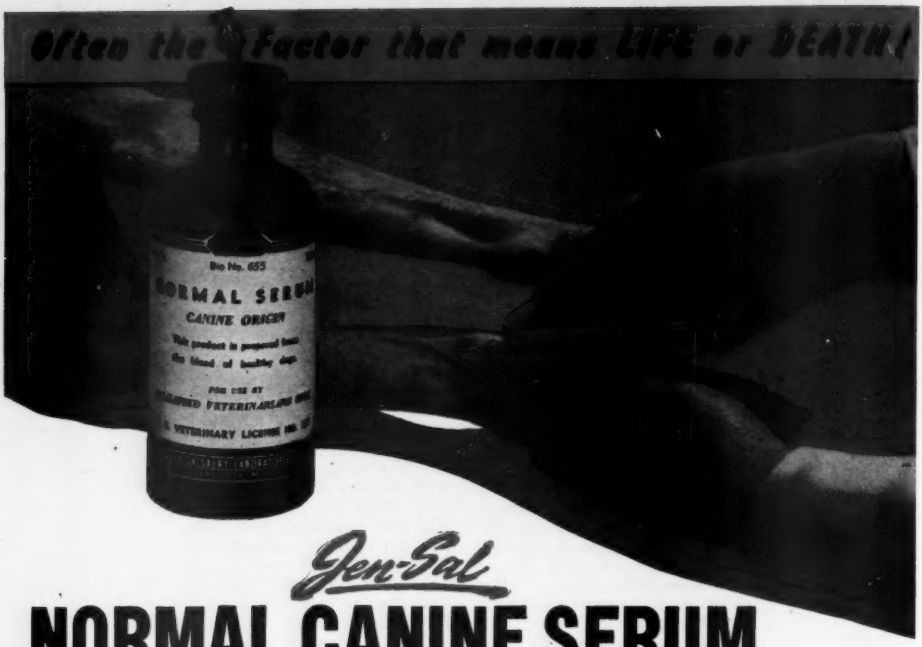

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Cases have been reported where severe allergic reactions develop if aerosol penicillin is given simultaneously or within a few hours of a pollen immunization or vaccine.

* * * *

In the treatment of shock or threatened shock, delay the treatment for burns or injuries—the immediate treatment must be for shock only.—*Military Surgeon.*

* * * *

Lennox, Harvard Medical School, reports that tridione (3, 5, 5-trimethyloxazolidine-2, 4-dione) "has been the most dramatic on its effect" on epilepsy of any form of therapy. Of 40 cases treated, 11 were cured and 28 benefited to the extent of 75% or more.

* * * *

Pregnant mares' urine has four or five times the monetary value of milk. It is the chief commercial source of natural estrogens which have a definite place in medicine. It is estimated that Quebec and Ontario farmers received more than a million dollars in 1945 from the sale of urine from pregnant mares.

* * * *

Not all of the pyrogens that cause an elevation of the temperature after intravenous injections are bacterial products in the water used in making the solutions which are injected. Some of them are sulfur compounds derived from the rubber of the injection apparatus. On this account some surgeons use tygon (a synthetic rubber) tubes for intravenous injections. They are inexpensive and are discarded after use, thus fine cracks do not develop in the interior surface from use, age and sterilization as is the case with natural rubber.

Promin is pronounced the treatment of choice for leprosy for it is the best treatment ever tested at the National Leprosarium.

* * * *

An intravenous injection composed of 95% alcohol one part and 5% glucose two parts, is much used in human surgery for anesthesia of short duration. The dose is 2cc per kilo.

* * * *

Five breeds of dogs were found best for Army purposes, and only these or crosses of these breeds, were acceptable for military uses. They are the German Shepherd, Belgian Sheep, Doberman Pinscher, Collie and Schnauzer.—*Dog World.*

* * * *

Fiberglas bandages are coming into extensive use for casts for fractures and to limit movement in other injuries. They are composed of glass and cellulose acetate, weigh only one-fifth as much as plaster casts, and do not hinder the taking of X-ray photographs of the parts.

* * * *

Veterinary science has a fundamental part to play in the solution of the problems that confront the world. The happiness and comfort of man largely depend upon the health and quality of his animals. A properly balanced system of animal husbandry means ample supplies of animal food products and a high state of fertility of the soil. When these two factors are assured there is food in abundance for all, and well fed men are happy men. On the other hand if there are shortages or want, man is discontented, he is apt to be jealous of his neighbor; we hear of the "haves" and the "have nots" and the seeds of war are set.—*Vet. Jour.* (London).

Getting back to listerian teaching, many hospitals are now giving considerable attention to disinfection of the air of operating rooms. This is accomplished by glycol sprays or ultraviolet rays, the former having the preference. A marked reduction in the percentage of operation wounds that develop infection is said to result from disinfection of the air of operating rooms, prior to and during operations.

Streptomycin and Streptothricin Compared

Notwithstanding the wide range of antibacterial activity of penicillin, there are a number of pathogens, against which it is not effective. The *Mycobacterium tuberculosis* is one of these.

An experiment at the National Institute of Health indicates that two of the other new antibiotic agents possess considerable tuberculostatic activity *in vitro*. They are streptrothricin and the nearly related stroptomycin. Of these the latter possesses 20 times the activity of the former.

An Addition to Antibiotic Agents

"Bacitracin" is the name given by investigators to a bacterial product they have discovered that retards or inhibits the growth of certain bacteria. It is produced by surface growth of nonpathogenic contaminants of the *Bacillus subtilis* group.

Bacitracin is said to be effective against a wide range of pathogenic organisms, including hemolytic streptococci, pneumococci, *Clostridium welchi* and *C. septicum*.

The possibility of large scale commercial production is being investigated with considerable promise that bacitracin may be produced far more cheaply than penicillin.

Veterinary Corps in the Peacetime Army

Plans advocated by the Surgeon General for a medical department for the postwar Army include a veterinary corps numbering one officer for each 1000 army personnel up to a strength of 500,000 and 0.5 officer per 1000 army strength above one-half million. Thus for an army of 1,500,000, the size advocated by the War Department, the veterinary corps would comprise 1000 officers.

The Surgeon General's plans also provide for an accelerated rate of promotion, to wit, appointed in the grade of first lieutenant, promoted to captain after two years, to major after eight years, to lieutenant colonel after 13 years and to colonel after 20 years' service. Retirement is provided at the age of 60.

The purchase of subsistence items by the Army at the Chicago Market Center fell from 993,000,000 pounds valued at $182,000,000 in June, 1945, to 513,000,000 pounds valued at $70,000,000 in September of the same year.

Penicillin Ineffective in Tetanus

W. A. Altemeier, M.D., Cincinnati College of Medicine, reports *(J. Am. Med. Assn.)* that in 16 established and generalized cases of tetanus, penicillin failed to show evidence of any beneficial effect on the course of the disease.

Give Adequate Dosage or None

By growing bacteria in subinhibitory concentrations, organisms may develop a resistance to penicillin to such an extent that they will tolerate 6,000 times the concentration that was active against the parent strain.—*Merck.*

Chronic laryngitis is a common disease of purebred, ram lambs in California. The mortality (from suffocation) exceeds 75%. No useful treatment is known. Britton attributes the malady to mechanical injury due to coarse grains, foxtail awns or other irritants of that nature. The disease occurs also in other sheep, both young and mature, but the incidence is low due to the different methods of feeding in commercial flocks.

Fur Bearers are Domestic Animals in Wisconsin

A law has been enacted in Wisconsin recently that declares fur farming to be an agricultural pursuit and fur bearing animals raised in captivity or "lawfully taken" to be domestic animals, subject to the laws of the state as to possession, ownership and taxation. The State Conservation Department has agreed to relinquish its jurisdiction over fur animals raised in captivity with the exception of otter, raccoon and skunk.

Petrolatum Best Sunburn Preventive

Experiments conducted at the Lighting Research Laboratory of the General Electric Company, Cleveland, for the Army Air Force, in an experiment designed to develop an ointment to protect fliers, downed in deserts and tropical seas, from sunburn as a result of long exposure to direct sunlight found "that dark red veterinary petrolatum was the safest, most practicable, most cohesive and nontoxic agent." "The product had to withstand heat and cold, be free from rancidity, lend itself to simple packing, be nontoxic and not wash off." A thin coating protects the skin from irritation for 20 hours of exposure to strong sunlight.

During the academic session 1944-45, six veterinarians completed the requirements and were granted diplomas in Veterinary Public Health by the School of Hygiene of the University of Toronto. Thirty-three physicians received diplomas in Public Health.

The West Virginia Health Department announces that four scholarships in public health will be offered successful applicants. They will receive nine months' postgraduate training at the School of Public Health, University of North Carolina leading to the degree of Master of Public Health Education. This will be followed by three months of field training.

Pigeons Prejudicial to Public Health

The Philadelphia Department of Health has adopted a resolution declaring that the city's public pigeons are prejudicial to public health. An amended ordinance permits city officials to trap and kill the birds. In a recent study for disease of a group of pigeons 35 to 48% were found infected with ornithosis. The pigeons are to be killed in a truck borne gas chamber of the Pennsylvania Society for the Prevention of Cruelty to Animals.

Plan to Accredit Schools of Public Health

The Commonwealth Fund has made available funds to the American Public Health Association to "create a properly constituted accrediting body to carry forward, progressively, a list of universities qualified with regard to program, personnel and facilities, to offer adequate courses leading to degrees of master of public health, doctor of public health and the diploma in public health." The present plan will be to examine schools for accreditation at their own request.—*J. Am. Med. Assn.*

It was within the present century that pellarga was first recognized in the United States. Granuloma inguinale and lymphogranuloma venereum, both first described in this country within a quarter century, are now known to be widespread. Histoplasmosis, chromomycosis, schistomiasis, visceral leishmaniasis, onchocerciasis, acylostomiasis and yaws, also, were once regarded as purely tropical diseases but are now known to occur more or less widely in the United States. Nor is that list complete; to it may be added typhus and various helminthiasis of recent discovery.

If, in recent years, so many new ailments of man have been found by a profession of such age and development as the medical profession, one can but wonder what diseases of animals remain unrecognized.

In an experiment at Iowa State College hogs receiving salt reached a weight of 300 pounds two months younger than swine on a salt-free ration.

At the beginning of 1946 there were 40 million beef cattle in the United States—an increase of about 30% above the average number for 1935-39. The total number of all cattle was approximately 82 million according to Secretary of Agriculture Anderson.

During 1945 about 123 billion pounds of milk were produced in the United States by just over 26 million cows. Thus the average production per cow was 3,800 pounds; meaning that several million cows did not pay for their keep.

During the past two years 20 cases of undulant fever due to the melitensis type of the Brucella organism have been recognized in Iowa. Previously only the abortus and suis strains were thought to infect persons in that state. The source of the infection was not positively identified, but swine are suspected.

Yearling Hereford steers grazed at the rate of 43 per section on good pine and bunch grass range made an average annual gain of 228 pounds per steer over a four year period. Comparable steers grazed on similar range during the same period at the rate of 56 per section (the usual stocking on such range) gained an average of 185 pounds. The income per section from the first group was $1215; from the second group $919.

There are 477 federally inspected meat packing establishments (about 360 companies) authorized to ship meat from one state to another. There are 365 nonfederally inspected meat packers each producing over two million pounds of meat per year. There are 4300 nonfederally inspected meat packers, each producing 300,000 to 2,000,000 pounds of meat per year, and also 22,000 butchers and over 4,000,000 farmers who dress livestock.—*Swift & Company Yearbook.*

The first federal appropriation for scientific research was made during the War of 1812. It was for military ordnance. Three federal wartime research agencies were established during the Civil War, six during World War I and 12 during World War II. The first appropriation by the federal government for peace-time research was made in 1836. Vast sums have since been appropriated for such research, mainly by the Department of Agriculture, the Weather Bureau and the Bureau of Standards.

Associated Serum Producers Expand Educational Campaign for 1946

The Associated Producers, Inc., has voted the largest appropriation in its history for the expanded coast-to-coast public education program this year. The two main objectives in 1946 will be to make people more conscious of animal health problems, and to show animal owners the wisdom of relying on the veterinarian for dependable diagnosis and treatment.

The expanded campaign will include national magazines, farm publications, newspapers and radio stations "blanketing" every section of the country. The 22 magazines and farm papers included in the campaign, reach more than six million readers per month. The series of educational advertisements entitled "What the Veterinary Profession Means to Mankind," featuring major accomplishments of the veterinary profession both in public health and animal health will be stressed in these publications.

The newspaper campaign will be two-fold—a series of illustrated articles and cartoons dealing with animal health problems and veterinary service to 2,600 newspapers, and regular news releases on timely animal health subjects throughout the year to 3,500 daily and weekly newspapers.

In radio, the Associated Serum Producers will also carry on a two-fold campaign on behalf of the profession. One phase will include livestock health news items throughout the year to 690 radio stations, coast-to-coast. Another phase will be an intensive spot announcement campaign in the spring, warning swine producers of the dangers of hog cholera and pointing out the advantages of having the veterinarian do the vaccinating. In addition, a special farm paper campaign in major hog-raising states will also feature this hog cholera theme.

Virtually all the material in the campaign will be issued over the name of the Associated Serum Producers' educational bureau, the American Foundation for Animal Health.

Member companies who are underwriting the cost of the campaign are: Allied Laboratories, Inc., Blue Cross Serum Co., Corn Belt Laboratories, Inc., Fort Dodge Laboratories, Inc., Grain Belt Supply Co., Jensen-Salsbery Laboratories, Inc., Liberty Laboratories, Missouri Valley Serum Co., Norden Laboratories, Pitman-Moore Co., Sioux City Serum Co., Sioux Falls Serum Co., The Columbus Serum Co., The Corn States Serum Co., The Gregory Laboratory, The National Laboratories Corp., The Royal Serum Co., The Southwestern Serum Co., and The United Serum Co.

Inspection of Poultry Meat

Recent rumblings within the poultry industry indicate a fear by the smaller dressing plants throughout the country that they will not be able to participate on an equal footing with large establishments in the forthcoming new method of preparing poultry for the market channels: that is eviscerating at time of slaughter at the dressing plant and marketing the products fully cleaned and prepared for the housewife.

The anxiety of small operators hinges mostly on the cost of equipment and the cost of inspection. These factors, they fear, will make it impossible for the little dressing plant to compete with the larger operators and will, in time, channel most of the marketing of poultry into the hands of the latter to the disadvantage of the small business man, whom the politician loves because of his number.

These fears are not entirely groundless at the present time but will vanish like the morning mist if some thought and effort are given to the matter. The quicker the better. It seems to be pretty well established in the minds of progressive poultrymen that the revolution in poultry marketing is at last well on its way and that poultry, like other meat animals, should be disemboweled and cleaned under inspection at the time of slaughter. With electric power available in all parts of the country, the mass production of store and home freezer storage space will, in the immediate future, make it possible, at last, to bring poultry marketing to a modern hygienic level comparable to that of other meat. There is little doubt that the future trend in poultry marketing is definitely toward the eviscerated, quick-frozen product. This granted, no wonder the small man in the poultry dressing business begins to worry. He sees barriers which threaten his existence in the industry; barriers which, as he approaches them, seem insurmountable. However, they are not at all as formidable as they seem to be. Equipment cost may be dismissed at once. Equipment manufacturers stand ready, and are able, to make suitable equipment at a reasonable price for the small as well as the large operator.

The second cost worry of the little poultry dresser, that of inspection, is real, not imaginary, at the present time. However, this problem, too, can be solved by a little concerted thought and action by the poultry dressers themselves, the veterinary profession and local, state and federal agricultural and public health agencies. The poultry industry belatedly wants inspection and must have it to hold its present market for its products. Official certification to the salubrity of its product is by

far the best and least expensive means of building that consumer confidence which boosts consumption. Furthermore, several large cities now demand a recognized inspection legend on canned and otherwise packaged poultry products. More communities are likely to enforce similar requirements as an inspected product becomes generally available. Uninspected poultry products will become increasingly difficult for brokers to handle as communities one by one throw up bars against them. Beyond all this there is the matter of public health. The consuming public is entitled to inspected food and is becoming more critical in this respect. In the final analysis it must be recognized that the public pays for inspection and to date there is every indication that it is willing and ready to pay for it and, in many locations, demanding that this safeguard to an important item in its food, be made mandatory.

As the poultry marketing picture of the years ahead takes shape it is becoming quite plain to forsighted members of the industry that to distribute freely and to promote greater consumption of their products it will be necessary that there be an official inspection and certification of them. There is no reason why an adequate, practical and reasonably priced inspection service cannot be made available to any and all poultry dressers anywhere in the United States. All federal, state and municipal meat and poultry inspection in force today is conducted by veterinarians. They are the accepted meatfood inspectors of the nation, both in peace and in war. The five or six-year courses in the state universities and colleges throughout the country which students must take to qualify as veterinarians fit them for this work. There are 15,000 college trained veterinarians available in this country from which to recruit a qualified personnel for this service to the poultry industry and to the consuming public. They are located in almost every city and town from coast to coast. Federal and state inspection systems, utilizing the services of these local veterinarians on a part or whole-time basis can make inspection available to even the smallest poultry dresser at a cost he can afford.

Also, in every state there is a state veterinarian and a force of graduate veterinarians on his staff working under the director of the state department of agriculture. These veterinary groups are assigned the tasks of disease eradication and control of the farm animal and poultry populations of the states. They also render other public services to the citizens of the states but up to this time it has never seemed necessary to include post-mortem poultry inspection amongst them. Where federal inspection is not available nor can be made available a state inspection system should take over.

It is possible the federal inspection service would work out plans to serve some of the small poultry dressing establishments if the need were sufficiently emphasized by the small dressers themselves. In some sections the cost of one federal inspector could be borne by three or four small plants within a radius of 20 miles or more, arranging among themselves to eviscerate on different days of the week. Mergers of three or four small dressers in a given section might solve the problem of inspection cost for some and at the same time be an advantage in marketing their products. Their present facilities could be retained as buying stations for a centrally located plant which would do all the slaughtering, eviscerating, packaging and freezing. The coöperative poultry plant idea could thus be extended into the field of individual plant owners.

Summing up the situation, it is plain that all the necessary ingredients are available. Some organized action is all that is necessary. With the federal and state agencies and the veterinary profession furnishing the filler and the poultry industry the dough it only remains to whip it into a reality, guaranteeing all concerned a piece of this chicken pie.

Value of Salt in the Swine Ration

In an experiment to determine the value of salt in swine rations, two groups of 14 shotes averaging 90 pounds weight were fed the same ration for 85 days at the Purdue Agricultural Experiment Station, except that group No. 1 received no salt and group No. 2 received salt free choice.

At the end of the feeding test the shotes in group No. 1 averaged 174 pounds and group No. 2 averaged 255 pounds in weight. Group No. 1 had consumed 451 pounds of corn, 100.7 pounds of protein supplement and 17 pounds of minerals per 100 pounds gain. Group No. 2 had consumed 314.4 pounds of corn, 73.1 pounds of supplement and 0.7 pounds of minerals plus 0.61 pounds of salt per hundred pounds gain.

Thus the average daily gain without salt was 0.99 pounds and with salt 1.94 pounds. The cost of feed per hundred pounds of gain in group No. 1 was $12.53, in group No. 2, $8.68; i.e., each pound of salt that group No. 2 consumed saved $6.37 worth of feed.

It is estimated that only 30% of swine raisers keep salt constantly before their animals.

Surplus Medical, Dental and Veterinary Equipment Available for Veterans

A procedure has been worked out whereby veteran physicians, dentists and veterinarians may purchase surplus army medical equipment directly from the disposal agency. The authority for this procedure is found in Public Law 457, 78th Congress, and appropriate regulations have been issued by the Surplus Property Administration.

In order to assist the individual in obtaining surplus property, there has been prepared by the Surgeon General of the Army, in collaboration with the disposal agency, a listing of items by army medical catalogue number, standard commodity classification number and army nomenclature, together with a price set by the disposal agency. This listing includes material appropriate for a professional office which was available as "declared surplus" in various army medical depots at the time the list was prepared. Supplemental lists are to be furnished as additional items become available. Copies of this list are being made available in service command headquarters, various army hospitals, medical depots and disposal agency offices. This listing should be used by individuals in preparing requests. It should be understood that not all of this material will be available in any one particular region, nor will the quantities of any given items be sufficient to satisfy all purchasers.

Veteran physicians, dentists or veterinarians should apply to the district office of the War Assets Corporation which is located nearest the veteran's residence. District offices are maintained in approximately 110 of the major cities throughout the country. The War Assets Corporation will certify applicants as to their eligibility to purchase surplus property.

Having obtained certification that the applicant is a veteran and that the property applied for is to be used in his own small enterprise, prospective purchasers may present their requirements to the learest regional office of the disposal agency or to the nearest district office of the War Assets Corporation, listing quantities desired by stock number and nomenclature as shown on the listing. Regional offices are located as follows:

Atlanta 3, 105 Pryor St. N.E.
Boston 11, 600 Washington Street.
Chicago 4, 209 South La Salle Street.
Cincinnati 2, 704 Race Street.
Denver 2, 728 Fifteenth Street.
Fort Worth 2, Post Office Box 1407.
Los Angeles 14, Pacific Mutual Building.
Kansas City 8, 2605 Walnut Street.
New York 1, 350 Fifth Avenue.
Philadelphia, Lafayette Building, Fifth and Chestnut streets.
San Francisco 2, 30 Van Ness Avenue.
Seattle 1, 2005 Fifth Avenue.

Regional offices will advise the applicant as to items, quantity, condition, price, availability and location of material within that region. An extract, listing items desired but not available in that region, will be forwarded by the regional office to the central stock control point in Washington. Information as to availability in other regions will be furnished by the Washington office to the regional office for transmittal to the applicant. This information will also include the quantity, condition, price and location of these items. On receipt of this information, the applicant will notify the War Assets Corporation regional or district office of the items desired, forwarding certified check for the total amount involved. The disposal agency will then order shipments from the army or navy storage depot, where located, in accordance with the detailed shipping instructions supplied by the applicant. Shipment will be made, transportation charges collect, to be paid by the consignee.

Although samples of equipment are available for inspection by the purchaser, they are located in various depots throughout the United States, and it is impracticable to assemble all the items in one or more locations for inspection. Further, it is impracticable for individual purchasers to visit the numerous depots where material is located in order to inspect prior to purchase. It is not possible, in case individual items of equipment are inspected by purchaser, to tag any particular piece of equipment for the individual purchaser to be held pending receipt of shipping order from the disposal agency. Purchasers are familiar with army and navy equipment, having worked with it during their military service. Prices for new, unused equipment, in excellent condition, have been set by the disposal agency. The material is classified according to condition and will be billed by the disposal agency at fair value. Prices will be scaled downward if used equipment is furnished. If only new, unused equipment, in excellent condition, is desired, applicants will so state and depots will not make substitution of material in less desirable classification. All claims and adjustments will be handled by the War Assets Corporation. These claims must be presented to the district or regional office handling the original request for purchase. It must also be understood that surplus property sales are in progress at all times and that delivery of all items selected by the applicant cannot be guaranteed, nor will back orders be established. Payments for equipment not furnished will be refunded. To the extent of availability, equipment will be shipped from the medical depot nearest the destination designated by the purchaser. However, surplus stock are not evenly distributed throughout the army and navy medical depot system, and shipments of some of the equipment will have to be made from depots at a considerable distance from the destination.

Military Awards

Recent Army awards to Veterinary officers include: Legion of Merit: Brig. Gen. R. A. Kelser, Col. Joseph F. Crosby, V.C., James E. Noonan, V.C.

Bronze Star Medal: Lt. Col. Charles K. Kitselman, V.C., Maj. Everett B. Miller, V.C., Capt. Willard R. Fetzer, V.C., Capt. Lewis L. Jackson, V.C., Capt. Herbert L. Marsh, V.C., and Capt. Jerry T. Martin, V.C.

Annual Report of the Commissioner of Agriculture (Horace Capron) for 1868

The prevalence of fatal maladies among all varieties of farm animals, resulting in the annual loss of not less than fifty million dollars, demands the prompt attention of this department, the vigilance of the agricultural associations and national and state legislation. The past year[1868] has not been one of peculiar misfortune in this respect, except in the dissemination of splenic fever, communicated by Texas cattle; yet, horses, mules, sheep and swine have all suffered from local prevalence of malignant forms of disease, against which little veterinary skill is opposed and little more than empiricism and superstitious folly is practiced. . . . The annual losses in swine cannot be less than 10 to 15 million dollars by the disease commonly known as "hog cholera" for which no remedy has been found; and prevention has proved difficult and uncertain. If motives of humanity should fail to influence, self interest in view of the annual losses of millions of dollars of value, should be a potential inducement to prompt action in this direction. The formation of veterinary colleges—not for the treatment of animals but for the education of a class of practitioners of skill and science who might become beacons warning the proprietors of stock of the approach of disease and pointing out the means of prevention, has been adopted in many European States from which much benefit to the community has been derived. I consider it eminently the duty of this department, not only to point out the want of such an institution but to initiate its establishment; and I earnestly hope that Congress may authorize, at an early day, the creation of a division of veterinary surgery for the investigation and prevention of the diseases of domestic animals and for the advancement and diffusion of veterinary science and for its most efficient and beneficient practical operation.

Although agriculture was the predominant occupation of the American people until after the war between the States, it was not until 50 years after the nation was founded that any appropriation was made by the Congress for the benefit of agriculture and not until the nation had been in existence for just 100 years that a department of agriculture was established in the President's Cabinet.

Federal recognition of veterinary science as necessary to the public welfare came about less tardily but still after much delay, and only after great and long continued losses from animal disease had been sustained by an agricultural industry that could ill afford them.

George Horace Capron, U. S. Commissioner of Agriculture, 1867-71, in each of his annual reports urged the Congress to establish a division of veterinary surgery in the office of the Commissioner of Agriculture. But it was 17 years before this was done. The new organization, which replaced the veterinary division established a year earlier by the Commissioner of Agriculture, was given a name—Bureau of Animal Industry—which completely concealed its veterinary character. A name may not affect the odor of a rose, but in this instance it profoundly influenced the standing and development of veterinary medicine in this country. But that is another story.

Referring again to Commissioner Capron: It is difficult to see how arguments so urgent as those he advanced for establishment of a division of veterinry science in the Federal Government could have been treated with indifference for nearly a score of years. The following from the Commissioner's report for 1868 illustrates the urgency of the need for animal disease control in this country 77 years ago—a need, as before stated, that went unheeded for 17 years after Commissioner Capron had pointed it out.

Vitamin A Deficiency

Two preliminary surveys in Australia indicate that vitamin A deficiency in sheep is not likely to occur until the flocks have been maintained under dry grazing conditions approximately one year. The vitamin A concentration in the blood remains constant until the stores in the liver are depleted. It then falls precipitately and nyctalopia supervenes. The terminal symptoms of vitamin A deficiency are given as paralysis due to demyelination in the spinal cord.

Persistence of Error

Through a mistake in translation an error made in 1884 has persisted in veterinary literature to the present. Dr. J. König gave the fat content of dolphin *(Meerschwein)* milk as 45.8%. In a paper by Professor Purdie, published in *Chemical News* in 1884, this figure (45.8%) was given as the fat content of guinea pig milk. The German for guinea pig is *Meerschweinchen.*

Although others have given the fat content of guinea pig milk as approximately 7%, the error made 61 years ago is still quoted more often than the correct amount.

Observations on the Treatment of Avian Coccidiosis (Cecal)

A Preliminary Report*

By W. T. S. THORP, J. FABRICANT, and MARION LEARNED
State College, Pennsylvania

THE cecal type of coccidiosis is one of the most common poultry diseases and probably one of the most widespread in this country. Many methods have been proposed and recommended as a means of control, prevention, and treatment of it. This report is a preliminary one and is presented as an indication to the veterinarians present of the possibilities which the future may hold.

Various changes in the ration such as the use of sour milk, buttermilk, dried whey, and dried buttermilk have been used with some success; however, none of these have been entirely satisfactory although not without some apparent benefit. Sulfur was advocated as a preventive treatment by Herrick and Holmes[1] and it has been used rather widely. Sulfur has no curative value when the infection has become established and, if used in the feed in more than 2% strength for more than several days, it may, under certain environmental conditions, produce rickets. The treatment of existing *Eimeria tenella* infections has been attempted and advocated to some extent during the past few years.

Levine[2] used sulfaguanidine with favorable results and, following his reports, this sulfonamide has been used extensively as a prophylactic measure and with some success in field outbreaks of coccidiosis. Horton-Smith and Taylor[3] showed that 2% sulfamezathine (2-sulfanilamido-4, 6-dimethylpyrimidine) in the feed prevented symptoms of coccidiosis when administered 96 hours from the time the chickens had been infected with *E. tenella*. Later they[4] showed that a saturated solution of sulfamezathine substituted for the drinking water had some curative effect on coccidiosis after symptoms had developed. In these experiments 55% of the 78 untreated controls died as compared with 10% of an equal number of chickens which had access to the solution after symptoms developed. The similarity of sulfamerazine (2-sulfanilamido-4-methylpyrimidine) to the compounds used by Horton-Smith and Taylor suggested that it might have possibilities. Swales[5] reported on the use of sulfamezathine and sulfamerazine and several other sulfonamides. This work confirmed that of Horton-Smith and Taylor as well as the report of Hawkins.[6] Swales[5] indicated in his report that sulfamerazine in its relatively insoluble powder form in the dry mash and in the form of the soluble sodium salt in drinking water was valuable in inhibiting the development of established infections. Horton-Smith and Taylor[7] in their latest report showed that sulfamezathine administered in the drinking water to chickens with induced cecal coccidiosis reduced the rate of mortality by 50 to 73%. The importance of these observations prompted us to undertake some preliminary studies.

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Experimental Procedure

The same general plan was followed with but few exceptions in the four experiments reported here. With the exception of one experiment (No. 1), 20 Barred Plymouth Rock males were used in each group. In the first experiment, each group consisted of 10 White Leghorn males and 10 Plymouth Rock males. All of the chickens in any one experiment were from the same hatch, were seven weeks old and were as nearly the same weight as possible.

Sub-acute coccidiosis in a four-week-old Single Comb White Leghorn chick. Note the unthriftiness, stunted growth, sleepiness and emaciation

Three different types or combinations of

several sulfonamides were used as the chemotherapeutic agents in each experiment. Sulfonamide No. I was administered to Group No. 1. This consisted of one part disodium-sulfathalidine and nine parts sodium sulfamerazine. This preparation dissolved promptly upon stirring in a reasonable quantity of water. Sulfonamide No. II consisted of one part sulfathalidine and nine parts sodium sulfamerazine with sufficient sodium carbonate to render the sulfathalidine soluble in water. The amount of this sulfonamide to be administered should be dissolved in a pint of water and then added to the larger volume, making the proper strength for the medicated drinking water. If 2gm of this drug were added to one liter of water, it would not dissolve because of the low concentration of alkali which is present. This combination was administered in all experiments to Group No. 2, sodium sulfamerazine to Group No. 3, and Group No. 4 was the untreated, infected control group.

In several preliminary experiments, in an effort to obtain typical symptoms of bloody droppings in all chickens, the drugs were not administered as soon after the appearance of bloody droppings as was desirable clinically thus allowing some losses to occur before treatment. In these experiments and the No. 1 experiment, for which data are given in Table I, 175,000 infective *Eimeria tenella* oocysts were administered. This resulted in extensive lesions which probably far exceeded those ordinarily encountered in field outbreaks. It was decided that in the subsequent experiments, 150,000 infective *E. tenella* oocysts would be given as the infective dose, although this dosage, probably produced lesions and symptoms exceeding those accompanying most field outbreaks.

The infective oocysts were concentrated and then diluted in such a way that each 1cc contained the desired number of oocysts. Counts of the number of infective oocysts were made at the time of dilution and before administration using the Levy counting chamber. They were administered into the crop with the aid of a 1cc pipette. At the first indication of bloody droppings, one of the various sulfonamide preparations described above was administered in the drinking water to each group at a level of 2gm per liter or 0.2% concentration. All chickens were fed the same growing mash before and during the experiments. The sulfonamides were administered in the drinking water at the same time every day for five consecutive days, using a fresh medicated solution each day.

The results of the four experiments reported here are shown in Table No. I. The percentage loss includes all losses from the time of inoculation until two weeks after treatment was withdrawn. Experiments in which the sulfonamide was administered in the mash have been carried out but these have not been extensive enough for a report at this time. Six field outbreaks of coccidiosis have been treated, three with sodium sulfamerazine and three with sulfonamide No. II.

Discussion

Many factors enter into the development of a satisfactory therapeutic agent for a poultry disease such as cecal coccidiosis. To be practical, it must be non-toxic, palatable, and the cost should be low enough to permit widespread distribution. Recent developments in the field of chemotherapy justify the belief that such a compound may be forthcoming.

The series of tests reported here are confined to the use of three different sulfonamides or combinations of two sulfonamides used in the drinking water for the treatment of induced avian coccidiosis. This work, for the most part, confirms that of Swales[5] regarding the use of sodium sulfamerazine. This drug, when given in the drinking water at a level of 2gm per liter was non-toxic and appeared palatable. The use of sulfonamide No. II, which consisted of one part sulfathalidine and nine parts sodium sulfamerazine with sufficient sodium carbonate to render the sulfathalidine soluble in water, was equally as good as the sodium sulfamerazine and in one experiment it was 5% more efficient. On the basis of the preliminary experiments here reported, the

TABLE I.—SHOWING THE RESULTS OR PERCENTAGE LOSS FROM INDUCED AVIAN COCCIDIOSIS TREATED WITH VARIOUS SULFONAMIDES ADMINISTERED AT THE RATE OF 2GM PER LITER OF DRINKING WATER AT THE ONSET OF BLOODY DROPPINGS

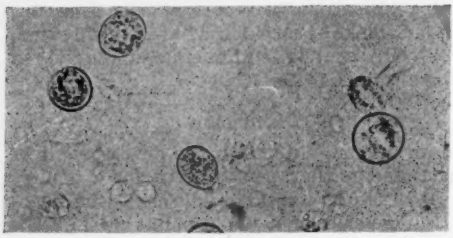
Expt. No.	No. of Chickens in Group	Infective Dose of Oocysts X 1000	Group I Sulfa. No. 1	Group II Sulfa. No. 2	Group III Sodium Sulfamerazine	Group IV Untreated Controls
No. 1	20	175	60%	45%	30%	60%
No. 2	20	150	40%	30%	25%	80%
No. 3	20	150	40%	20%	0*	80%
No. 4	20	150	45%	15%	20%	85%

*Treated but not infected.

sulfonamide No. I, which consisted of one part disodium-sulfathalidine and nine parts sodium sulfamerazine, was not as efficient as either sulfonamide No. II or sodium sulfamerazine.

The various field trials in which sulfonamide No. II and sodium sulfamerazine were used as chemotherapeutic agents were in flocks ranging in size from 100 to 400 chickens. In the six flocks treated, death losses stopped after the first 24 hours of treatment.

The coccidiostatic or coccidicidal mechanism of these sulfonamides is not clearly known. It is presumed that this effect probably is brought about by the inhibition of one or more of the stages in the life cycle of the coccidia. Some workers feel that the extreme



Oocysts of *Eimeria tenella*, x400.—Photo by Benbrook

pathogenicity of *E. tenella* is due to the repetition of the cycle of asexual multiplication and to check the disease the motile merozoites must be weakened or destroyed before they penetrate other cecal epithelial cells. More detailed work is necessary by many individuals before the exact mode of action is clearly established for all compounds. Likewise, it is not known what role the bacteria of the intestinal tract plays in the manifestations of the disease after the lesions have been established by the coccidia.

Summary

The data presented confirm the work of Swales[5] and Horton-Smith and Taylor.[3] The results were not as clearly defined as these reports, but the beneficial effect of the sulfonamides was evident.

The treated chickens (Table I) had as severe symptoms of cecal coccidiosis as the controls. With the exception of the No. 1 experiment, the treated chickens started eating again and exhibited increased vigor several days after treatment.

With the exception of the first experiment, there was a significant difference between the treated and untreated controls.

A limited number of field trials tends to substantiate the experimental data; however, this is a preliminary report and more trials as well as continuation of the experimental studies are necessary.

Acknowledgements

The authors express their appreciation to Sharp and Dohme, Inc., Glenolden, Pennsylvania, for preparing and furnishing the sulfonamides and research grant in partial support of the experimental studies.

References

1. Herrick, C. A., and Holmes, C. E. *Vet. Med.*, 31, pp. 390-391. 1936.
2. Levine, P. P. *Cor. Vet.*, 31, pp. 107-112. 1941.
3. Horton-Smith, C., and Taylor, E. L. *Vet. Rec.*, 54, p. 516. 1942.
4. Horton-Smith, C., and Taylor, E. L. *Vet. Rec.*, 55, pp. 109-110. 1943.
5. Swales, W. E. *Canadian J. Res.*, D., 22, pp. 131-140. December, 1944.
6. Hawkins, P. A. *Vet. Med.*, 39, p. 251. 1944.
7. Horton-Smith, C., and Taylor, E. L. *Vet. Rec.*, 57, pp. 35-36. 1945. Summary, *Vet. Med.*, 40:5, p. 173. 1945.

* * * *

Fifteen million ducks are produced annually in this country. They can be grown to four pounds in weight in nine weeks on 20 pounds of feed.

* * * *

More eggs are produced in the Petaluma district of California than in any other area of equal size. In 1944 this district shipped over 30 million dozen eggs to San Francisco and the Bay District.

* * * *

Commercial broiler raising increased from 43 million in 1935 to 198 million in 1944. Broilers are produced largely in Maryland and in mountainous counties of Georgia, North Carolina and Arkansas.

* * * *

In turkeys consumer preference is definitely for small and medium size birds. The trend is strongly to the quick-frozen, eviscerated product. The New York dressed storage turkey is on the way out. Hotels prefer turkey meat for chicken salad, chicken a la king and chicken sandwiches, because it slices to better advantage and is more economical.

* * * *

The shell of an average hen's egg contains about 8000 pores but there are wide variations in the number and size of the pores in the eggs of different hens. The best shells have a large number of very small pores. Evaporation is slow through such shells and the eggs retain their quality longer than eggs with poor shells (large pores and fewer of them) from which evaporation is rapid.

Modified Technic for Red Cell Determination in Goats

By ROSA KUBIN, PhD. and ARTHUR E. LAGER*
Waltham, Massachusetts

CAREFUL morphological blood examinations of all goats entering our clinic have shown that most of them suffer from hypochromic microcytic (iron deficiency) anemia. Etiologically, these are due mainly to parasitic infestations. Caprine parasites such as Bunostomum spp., Hemonchus spp., and Ostertagia spp. produce very severe anemic conditions of the hypochromic microcytic type (with complicating edema and hydrema); whereas others such as Strongyloides spp., Trichostrongylus spp., and Dictyocaulus spp., produce conditions in which anemia is not the predominant symptom.

Chronic enteritis of any etiology, but often caused by tapeworms, may lead to a hyperchromic macrocytic anemia due to the reduced absorption in the intestinal tract. It is desirable before administering any anthelmintic to establish the type and extent of anemia in order to determine whether supplementary treatment, such as iron or vitamins, is necessary.

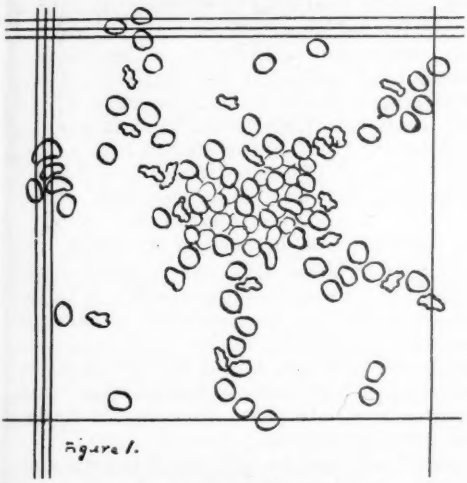


Fig. 1. Caprine red cells suspended in Hayem's solution. Note crenation, clumping, and unequal distribution of red cells which causes inaccurate counts

When routine technic is followed in examining caprine blood, a common difficulty is the clumping of the erythrocytes on dilution (Fig. 1). We have found that this clumping does not occur when physiological saline (0.85% NaCl) solution is substituted for Hayem's solution (Fig. 2). We believe that the clumping is due to the low resistance of the caprine erythrocyte to changes in tonicity of the suspending medium. Slightly hypotonic solutions will cause hemolysis and slightly hypertonic solutions will result in crenation of caprine red cells. This is demonstrated clearly by the Saline Fragility Test. Caprine erythrocytes start hemolyzing at a concentration of 0.77% to 0.69% sodium chloride solution (minimum resistance) as compared to canine erythrocytes which do not hemolyze until the concentration is reduced to 0.46% to 0.40%. Consequently, the use of a hypertonic dilution fluid such as Hayem's solution leads to crenation and subsequent clumping. The use of isotonic saline solution completely preserves the shape of the erythrocyte.

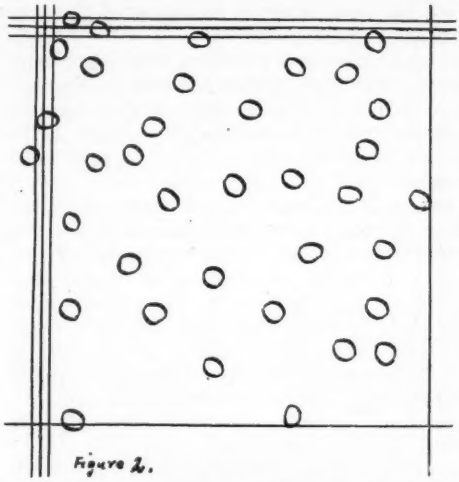


Fig. 2. Caprine red cells suspended in isotonic saline solution. Note the absence of distortion and equal distribution of the erythrocytes

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References

Wirth, D., Grundlagen einer Klinischen Haemotologie der Haustiere, Urban and Schwarzenberg, Wien, 1931.

Mönnig, H. O. Veterinary Helminthology and Entomology, Williams and Wilkins Co., Baltimore. 1941.

Hutyra, F., Marek, J., and Manninger, R. Special Pathology and Therapeutics, Alexander Eger, Chicago. 1938.

Bovine Surgery*

SURGERY is a great practice builder. We can't be sure about our medical treatment. Perhaps the animal would have recovered anyhow, but when it is salvaged by surgery there can be no question about it. It is visible and understandable to our clients, hence its efficacy as a reputation and practice builder.

But surgery must be good. It requires skill and judgment. It requires skill the quack has little opportunity to acquire. Because of its preciseness it is much easier to differentiate between the competent practitioner and the quack by their surgical practices than it is by their medical practice.

Resourcefulness is necessary in surgery. The surgeon is constantly running into unexpected conditions that require skill and judgment. Boldness too is necessary but, except it be teamed with skill, boldness is fraught with disaster.

Accurate diagnosis, based upon thorough physical examination must precede successful surgery. Most of our clients know from experience or from the experiences of friends that physicians make a careful physical examination of the patient before undertaking a major operation. They examine not only the site of the operation, including radiographs, but the temperature, heart action, emunctories and history. Usually, specimens of blood and urine are submitted to laboratory examination. The operation may be postponed for a time while the strength of the patient is built up by good care and such medication as may be indicated. These clients may not expect the same preliminaries to surgery on their animals, but when all such preliminaries are omitted and the operation is a failure, they are apt to adopt a critical attitude toward the operator. Even if he escapes any blame by others, he should censure himself for having taken unnecessary risks.

The animal that has been shipped any considerable distance and passed through a public stockyard or has been transported in an infected truck or gone through a community sale may be carrying almost any latent infection. Perhaps it may be in the incubation stage of some respiratory infection. The hemorrhage and shock incident to surgery may cause the animal to break down while other members of the same shipment escape the development of frank disease.

The feed that an animal has had interests the surgeon; since its nutritional state is an important factor in evaluating it as a surgical risk. Animals suffer from many deficiencies, usually marginal or moderate, but sometimes acute. A deficiency of vitamin A lowers resistance to infection. Vitamin C deficiency delays and, if acute, prevents wound healing. If one or more deficiencies in essential food elements of the ration or an inadequacy in quantity has brought the animal to a stage of marked malnutrition it is a poor subject for surgery. In such cases, building up the strength and vitality of the animal before undertaking a major operation, usually pays good dividends. Strangely, the deficiency most common in animals presented for operation is a deficiency of water. It is easily remedied, but it may take 24 to 48 hours.

Except in advanced stages sweet clover disease is not detectable clinically. The history must be depended upon to reveal this condition. Careful inquiry as to whether the animal has consumed sweet clover, hay or pasture, may enable one to avoid an extremely embarrassing situation. If the operation is imperative and urgent and bovine blood drawn into a test tube takes longer than 12 minutes to clot firmly, a blood transfusion from a normal animal of the same species is indicated, preliminary to even a minor operation. Otherwise eliminate all sweet clover from the ration for a period of 60 days before operating.

Pregnancy offers little risk to the surgical patient, but occasions considerable risk to the reputation of the surgeon, since owners are prone to ascribe abortion, in an animal that has been operated upon, to the effects of the operation. They often do this, even when months have intervened between the operation and the abortion.

Anesthesia must be used for all but the most minor operations. There can be no good surgery without restraint and relaxation, and relaxation demands anesthesia. There are many obstacles to the use of anesthesia in the field but they can be overcome, and they are overcome, by those who do good surgery. General anesthesia is not often required, but when it is required it should be employed.

In horses chloroform may be used without skilled assistance, but chloral hydrate given intravenously spares the operator considerable nerve strain. Personally, I dislike to use chloroform in cattle. General anesthesia in the adult bull of any breed, and in fat beef cattle, is risky and I prefer local anesthesia if it can

*Notes from address by Dr. George R. Fowler, Professor of Surgery, Iowa State College, at the annual meeting of the Northern Illinois Veterinary Medical Association Meeting, Rockford, October 24, 1945.

possibly serve the purpose, nembutal, intravenously, is very satisfactory for young animals and adult cows of the smaller breeds. If over 125 grains are required it may cause delirium and respiratory depression. It is more expensive than chloral but has a smoqther induction and recovery.

In the use of chloral hydrate for a 1000-pound animal, I dissolve two ounces of chloral and one ounce of magnesium sulphate in 500cc of water—distilled water if it is made up at the office, boiled water if it must be prepared on the farm. This is an irritant solution that must be injected truly intravenously. No leakage into the tissues can be permitted. Injection is accomplished safely by inserting a large caliber needle into the jugular vein and passing a tomcat catheter through it. The injection must be made slowly and against the blood stream. This chloral hydrate—magnesium sulfate solution—is a heavy one—specific gravity 20% higher than that of blood. If it is not injected slowly some drops of it may flow along the bottom of the blood stream to reach the heart undiluted and cause a great deal of trouble. If this solution reaches the lining of the heart in concentrated form it may cause either a permanent halt of that organ in diastole or fibrillation with the same result on the animal. Another good reason for giving the anesthetic slowly is the whole of the 500cc may not be required and if it is administered slowly the injection can be discontinued when the animal has received a sufficient quantity, as will be evidenced by the onset of surgical anesthesia.

The surgeon must not forget that the thermotaxic control is thrown out of adjustment by anesthesia and variations in temperature of no consequence to the normal animal, causing not only great discomfort to the recently anesthetized animal but genuine hazards, the consequences of which are often disastrous. After the operation the animal requires shelter and blankets in cool or cold weather and shade and a free circulation of air when the weather is warm.

A great many operations can be performed with regional, infiltration or local anesthesia. Rumenotomy, for example, is satisfactorily performed in gentle cows by the use of local anesthesia. If the animal is not gentle, a half-ounce of chloral or 15 to 20cc of nembutal will often subdue it. For operations on the udder, I prefer infiltration anesthesia. Operations on the perineum are conveniently performed in cattle with epidural anesthesia. In the horse epidural anesthesia is not so satisfactory as in cattle, except for operations on the tail. When the horse is given sufficient anesthetic to make standing difficult he goes crazy; the cow will stand as long as she can, and when she can't stand, calmly lie down.

Paravertebral block is a fine type of anesthesia, but it requires both skill and practice to use it successfully. It is harmless and relatively painless and there is nothing to prevent the surgeon from practicing upon his own animals until he acquires the requisite skill to make the injection properly in surgical cases.

The surgeon must evaluate his subjects as individuals not as a species or members of a group, all of which react alike. Everyone recognizes the difference in the reaction of the beef cow and the dairy cow to feed. If both are fed a highly nutritive ration during lactation, the one will get fat the other produce more milk. Even during the non-lactating period when both will fatten, the fat is deposited in different locations in the two animals. It is not so generally appreciated that beef cows and dairy cows react as differently to medication, restraint and nervous stimuli as they do to feed.

For example, milk fever and acetonemia rarely if ever occur in beef cows; a good many dairy cows suffer from these conditions and, what is more important, a far greater number

A case of acetonemia in a first-calf Jersey heifer

are on the brink of one or the other of these conditions all the time. A sudden disturbance in a dairy barn may cause convulsions in one or more cows within hearing of it. These conditions are manifestations of deficiencies due to the drain and the strain of heavy milk production. Cows suffering such deficiencies are apt to experience disaster if operated upon without preliminary preparation. A liberal injection of calcium gluconate and dextrose just before giving the anesthetic is a precautionary measure that pays well in such cows.

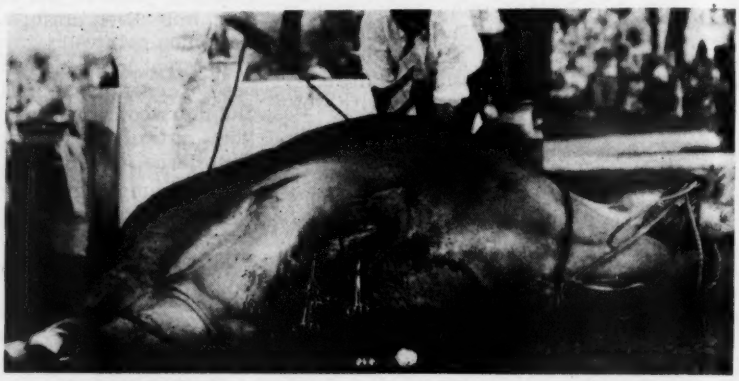
I am a great believer in blood transfusion

following major operations. If there is any reason to suspect deficiencies in the animal, or if there has been considerable hemorrhage, a blood transfusion provides a needed boost that not only prevents some untoward sequels to the operation but hastens the onset and shortens the period of convalescence, which, of course, it is the aim of good surgery to attain.

In the horse direct transfusion is practicable because of the slow clotting of equine blood. In cattle we usually have to rely upon citrated bloods. I prefer to get it from a different herd since it is not likely to be suffering from the same deficiencies as the herd to which the animal that is being operated upon belongs.

for good surgery. In such cases, the mistake is made and the case lost at the time the line of treatment is decided upon. Surgical intervention as a last resort is not going to correct that first mistake in an appreciable percentage of cases. In such cases even though the dam succumbs, as she probably will, it is the diagnosis not the operation that failed.

The time element is to a large extent decisive in deciding whether or not to do a cesarean section. When the examination is made, if it appears delivery by the natural route is to be a long drawnout procedure, cesarean section should be performed without further delay. This applies in all species of farm animals except the mare.



Cesarean section near the median line. The covering of the field of operation was removed for photographing after the skin incision was made and before the incision into the abdominal wall. Surgeon: Dr. E. R. Frank

In severe hemorrhage or shock the amount of blood transfused should be considerable, 300 to 400cc per 100 pounds, body weight. For a general stimulant, 500 to 1000cc may be given daily for two or three days.

It is important, when a surgical operation is resorted to in the treatment of an animal that it be done at a time as favorable for recovery as circumstances permit; not put off till everything else has been tried and the case is near hopeless. This is well illustrated by cesarean section. When one is called for the relief of dystocia, an examination should be as thorough as possible without contamination of the uterus. Such examinations cannot be aseptic but at least gross contamination and mechanical injury of the genital tract can be avoided. When the examination is complete, a decision should be made to perform or not to perform a cesarean operation. If the decision is to operate one should proceed with it at once. If the decision is not to operate the matter should be put out of mind and other means of treatment employed. In no case should everything else be tried and then cesarean section resorted to on the theory that it may save the animal which otherwise is going to die. No one, who selects his cases in that manner, will ever acquire a reputation

In cesarean section the operator has a choice of three sites for his incision, the left flank, the right flank and near the median line. If the fetus is carried low the latter is selected. A disadvantage of operation at this site is the liability of the sutures to tear out. This mishap can be largely avoided by the use of kangaroo tendon and by restricting the diet for several days following the operation. Rubber gloves should be worn for this and other operations. When the hands are contaminated, they cannot be sufficiently cleaned quickly.

If the fetus is carried high and the rumen is near empty the left flank shoud be chosen for the operation.

If the fetus is carried high and the rumen is loaded, the right flank is chosen for the abdominal incision. The disadvantage here is the small intestine. Regardless of what the anatomies say, there seems to be over 1000 feet of small intestine in this flank. But withal, it is less bothersome than a full rumen.

Rumenotomy is a life-saving operation. But, as in cesarean section, there is a time to do it. If one waits till there are two strikes and three balls on him, the cow will usually live two or three days and then die. When operated upon in time, the operation is nearly always successful. One often hears the state-

ment, "The operation was a success but the patient died." The truth of the statement depends upon the objective of the surgeon. If it is to remove a tumor, or a fetus, fermenting ingesta from the rumen or a testicle and that is accomplished, it may well be the operation was successful. If the object of the operation was to salvage the animal, it has, of course, failed if the animal dies. To return to the subject of rumenotomy; a good many men attempt to perform this operation with a large trocar. Only when it fails, as it usually does, for anything but a gas bloat, do they resort to scalpel, forceps and sutures. But, of course, this is not the best way to go about a rumenotomy.

Paravertebral anesthesia is ideal for rumenotomy but most of us will probably continue to employ infiltration. The skin incision should be large—nine inches long—to avoid traumatizing the rumen or the operator's arm. To prevent leakage into the peritoneal cavity the skin should be sutured to the rumen before the latter is incised.

When the rumen is cleared of ingesta, recovery is better if a couple of buckets of water are poured into it and left there. Add a couple of quarts of molasses if the animal has been off feed. Two rows of sutures should be used to close the rumen—the first row being turned in by the second. The skin incision should be closed with interrupted sutures.

Urinary calculi kill many feeder steers. There are many theories as to what causes calculi in these animals, but they all fail to endure the light of clinical experience. The most practical treatment perhaps is to drain the bladder with a 12-gauge, 15-inch needle and send the animal to slaughter. However, if the owner desires to feed the animal and market it with the remainder of the lot, the condition is operable if it has not existed too long. Using epidural anesthesia, make an incision over the penis just below the brim of the pelvis. Cut the penis, draw the proximal end through the skin and suture to the skin so that about two inches of the organ hangs free. This operation gives good satisfaction where there is a single calculus or even a number of calculi lodged at the "S" curve. Where there are multiple calculi lodged at the neck of the bladder there is no chance to salvage the animal by other means than immediate slaughter.

Foot rot in cattle is a great nuisance some seasons. It is more prevalent in lots paved with crushed rock or cinders than it is on soil. A common treatment in northwest Iowa, where the condition is sometimes prevalent, is the hypodermic injection of a foreign protein. Hog cholera antiserum, being the most convenient, is the one generally employed. However, by the time a veterinarian is called, at least a few cases have usually progressed to where amputation of a claw is necessary. This amputation is conveniently accomplished by means of a wire saw. Necrosis of the end of the bone has followed this operation. It is caused by heat from the saw and can be avoided easily by having a cold antiseptic solution poured on the wire while the bone is being severed. It is a life saving operation.

Repair of an umbilical hernia in a 18-month old heifer under general anesthesia (7% solution of chloral hydrate intravenously). Surgeon: Dr. James Farquharson

The Treatment of Acute Infectious Bovine Mastitis with Penicillin*

By C. S. BRYAN,** J. W. CUNKELMAN** and F. W. YOUNG,**
East Lansing, Michigan
and E. E. VISGER
Okemos, Michigan

THE immediate problem of mastitis control, as it confronts many veterinarians and dairymen, is the treatment of acute mastitis. The object is to return the affected cow to the milking line at the earliest possible moment. The cases encountered include *acute local mastitis*, where all apparent involvement is local to the udder, and *acute systemic mastitis*, which is characterized by the local udder symptoms and systemic symptoms of illness due to the existing toxemia or bacteremia.

The aim of the treatment is essentially to remove the cause, thus aiding the tissue in its return to normal so that a milk of normal physical appearance, in the usual amount, is again secreted. The cause may be non-infectious resulting from some form of injury to the udder tissue or infectious in nature. When injury is responsible for the acute mastitis a close examination will usually reveal the local effects of the trauma. The clinical picture of acute infectious mastitis is usually quite clear: a sharp drop in milk flow, frequently an increase in body temperature, a hot painful swelling of the udder that appears suddenly and the production of abnormal milk in one or more quarters are customary symptoms. Although treatment must be started immediately a milk sample should be collected for bacteriological examination to confirm the presence of infection and to determine the type of bacteria involved. In all herds having trouble with acute mastitis a thorough study should be made of the milking and herd management procedures with a view to making changes to minimize untoward influence on the physiology of milk secretion. Chemotherapeutic agents are effective only in the treatment of infectious mastitis. Penicillin is especially indicated in cases caused by the streptococci[1] or staphylococci.[2] This report deals with the treatment of acute streptococcic and staphylococcic mastitis.

Methods

The animals included in this study were in farmer owned herds; thus the work was carried on in many herds under a varying local condition. A clinical examination was made of each patient before, during, and after treatment and a milk sample (composite) or samples (individual quarters) were collected for bacteriological examination. The microscopic test[3] was employed to determine the presence or absence of infection and to indicate the type of infection. Penicillin treatment was started immediately in all cases of acute mastitis suspected of being of infectious origin. This diagnosis was made on the basis of the clinical picture presented, the bacteriological examination being to verify or modify the diagnosis. If the condition of the patient required, treatment was repeated in 12 or 24 hours, or the therapy was switched to sulfanilamide. Each sick cow was kept in the barn, so that the proper care could be given. General supportive treatment was administered as indicated; including dextrose intravenously and stimulants and tonics orally. Whenever possible moist heat was applied locally to the udder for 30 minutes at two-hour intervals. This was followed by drying the surface of the udder and thorough massage after the application of an udder ointment or liniment. Complete stripping of the udder was practiced following an approximate six-hour contact period with penicillin, and continued at two-hour intervals until the following penicillin infusion.

Results and Discussion

The results of the treatment of ten cases of acute, local streptococcic mastitis with penicillin are presented in Table I. The clinical manifestations were evident in only one quarter in four cows, in two quarters in three, in three quarters in two cows, and in all four quarters of one cow. In each case the diagnosis of streptococcic infection was made by the microscopic examination of properly collected and incubated milk samples. The infected quarters of two cows were infused with 10,000 units per quarter, two with 20,000 units each,

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**Michigan Agricultural Experiment Station, Section of Surgery and Medicine.

two with 50,000, two with 80,000, and two with 100,000 units in from five to 100cc of sterile water. The infusions were repeated at either 12-hour, 24-hour, or 48-hour intervals until a decided improvement was noted. Clinical recovery occurred in all of these cases in from three to 18 days, but bacteriological recovery occurred in but two of the ten cases. The remaining eight cows were treated with from 1,000 to 20,000 units of penicillin in five to 25cc of sterile water per infected quarter during the chronic stage of the disease. Four of the cows recovered bacteriologically with one infusion, three required two treatments and the remaining one required three treatments. Atrophy occurred in one quarter in each of two cows, slight induration in the udders of two cows, moderate induration in one cow and one quarter became non-functional as a sequel to the acute, local mastitis.

Ten cases of acute local mastitis of staphylococcic origin are also presented in Table I. The acute symptoms were localized in one quarter in each of five cows, in two quarters in each of three cows, and in three quarters in each of the remaining two cows. As before, the udder infusion treatments with penicillin were given in varying numbers of units per quarter, at 12, 24 or 48 hour intervals, in from 25 to 100cc of sterile water per quarter. Clinical recovery occurred in from five to 22 days in the various animals. Although atrophy occurred in one quarter each of two cows, slight induration in another, and marked induration in the udder of one cow, clinical and bacteriological recovery occurred simultaneously.

Thirteen cases of acute systemic mastitis were presented for treatment. Bacteriological examination of the udder secretion revealed that seven cases were caused by streptococci and staphylococci were responsible for the infection in the other six cases. Irrespective of bacterial cause, the disease was characterized by a greatly decreased quantity of abnormal mammary secretion, a hot, painful swelling of one or more quarters, marked general depression, anorexia and an increased body temperature.

The results of treating these cases with penicillin are presented in Table II. The distress exhibited by these animals called for prompt therapy. Immediately, 200,000 units of penicillin were given, intravenously, in 25 to 100cc of sterile water, and 100,000 units of penicillin, in from one to 100cc of sterile water per quarter, were administered into the involved quarters of each udder. Thus if only one quarter was acutely affected the 100,000 units were infused into it. In like manner 50,000 33,000, or 25,000 units were administered per quarter when two, three or four quarters, respectively, were involved. The intravenous and intramammary administrations were repeated at approximately 12-hour intervals as needed. Supportive treatment of dextrose intravenously, tonics and stimulants orally and hot applications locally to the udder was used as indicated. Only two of the 13 cases of acute systemic mastitis treated in this way died. Gangrene of the udder due to staphylococci, which was evident when one of these cows was first seen, progressed rapidly to a fatal conclusion. In the other case that succumbed the infection was due to streptococci. In no case was clinical recovery accompanied by bacteriological recovery where streptococci were the etiological agents, but bacteriological recovery did occur in all but one case of the staphylococcic mastitis. The cases of streptococcic infection were later treated during the chronic stage of the disease following the acute attack. In each case the infection was destroyed.

An additional group of seven cows with acute systemic mastitis was treated by two penicillin treatments at 12-hour intervals and sulfanilamide by mouth at the rate of 900 grains (approximately one grain per pound of body weight) the first day, 600 and 300 grains on the second and third days, respectively. Streptococci were responsible for the disease in three cases and staphylococci in the remaining four instances. The advantage of this line of therapy lies in the fact that the veterinarian can apply the intramammary and intravenous medication on two calls approximately 12 hours apart, and the farmer can continue the treatment by administering the sulfanilamide orally for the following three days. All but one of the seven animals in this group recovered from the acute mastitis; the seventh animal died (Table III). The period required for clinical recovery was slightly longer by this system of medication than in those cases where the penicillin treatments were repeated more often. One of the cows infected with Streptococcus was treated successfully with one injection of penicillin in the chronic stage following the acute attack; while a second cow required two penicillin treatments for recovery. Two of the cows infected with Staphylococcus recovered both clinically and bacteriologically while the other two required a second treatment with penicillin following the acute attack. The practical application of this system of medication is obvious.

It is of interest to note, in Table I, that the infusion of 1,000, 5,000, or 20,000 units of penicillin effected bacteriological recovery during the chronic stage of the infectious mastitis

TABLE I.—A COMPARISON OF RESULTS OBTAINED IN THE TREATMENT WITH PENICILLIN OF 10 CASES OF ACUTE LOCAL STREPTOCOCCIC MASTITIS AND 10 CASES OF ACUTE LOCAL STAPHYLOCOCCIC MASTITIS

Acute Local Mastitis Stage								Outcome			Chronic Stage—2 to 4 Weeks After the Acute Stage			
			Penicillin Treatment of Infected Quarters				Days Before Clinical				Penicillin Treatment for bacteriological recovery			
Case	Clinically Affected Quarters	Microscopic Test	No.	Interval	Units	Volume	Improvement	Recovery	Microscopic Test	Other	Number of Treatments	Interval	Units	Volume
1	3	Strep.	8	12 hr.	100,000	100cc	3	10	Strep.	Moderate induration	2	3 days	1,000	5cc
2	4	Strep.	5	24 hr.	100,000	25cc	4	8	Strep.	.....	1	.....	1,000	5cc
3	2	Strep.	6	48 hr.	80,000	25cc	6	18	Strep.	1 quarter blind	1	.....	5,000	25cc
4	1	Strep.	4	24 hr.	80,000	50cc	1	3	Negative	Atrophy	..	.....	....	....
5	2	Strep.	4	48 hr.	50,000	5cc	3	8	Negative	.....	..	.....	....	....
6	1	Strep.	12	24 hr.	50,000	100cc	8	14	Strep.	Slight induration	3	4 days	20,000	50cc
7	2	Strep.	3	24 hr.	20,000	100cc	2	5	Strep.	.....	1	.....	10,000	5cc
8	1	Strep.	3	48 hr.	20,000	25cc	2	15	Strep.	Slight induration	2	3 days	5,000	10cc
9	3	Strep.	3	48 hr.	10,000	50cc	3	8	Strep.	Atrophy	2	4 days	1,000	5cc
10	1	Strep.	4	48 hr.	10,000	25cc	5	12	Strep.	.....	1	.....	1,000	5cc
11	1	Staph.	8	24 hr.	100,000	100cc	8	14	Negative	Atrophy	..	.....	....	....
12	1	Staph.	3	24 hr.	100,000	25cc	2	5	Negative	.....	..	.....	....	....
13	3	Staph.	6	24 hr.	80,000	25cc	5	10	Negative	Moderate induration	..	.....	....	....
14	2	Staph.	12	24 hr.	80,000	25cc	2	18	Negative	Slight induration	..	.....	....	....
15	1	Staph.	6	12 hr.	50,000	50cc	3	8	Negative	.....	..	.....	....	....
16	2	Staph.	10	12 hr.	50,000	50cc	4	6	Negative	.....	..	.....	....	....
17	3	Staph.	8	24 hr.	33,000	100cc	6	15	Negative	.....	..	.....	....	....
18	1	Staph.	6	48 hr.	33,000	25cc	5	22	Negative	.....	..	.....	....	....
19	1	Staph.	5	24 hr.	20,000	25cc	3	8	Negative	Atrophy	..	.....	....	....
20	2	Staph.	7	24 hr.	10,000	50cc	4	6	Negative	.....	..	.....	....	....

TABLE II.—THE TREATMENT WITH PENICILLIN OF SEVEN CASES OF ACUTE SYSTEMIC MASTITIS CAUSED BY STREPTOCOCCI AND SIX CASES CAUSED BY STAPHYLOCOCCI

Case No.	Quarters Clinically Affected	Number Infected Quarters	Microscopic Test	Penicillin Treatment						Outcome			
				Number	Interval, Hours	Intravenous Units	Volume, cc	Infusion per Quarter	Volume, cc	Days Before Improvem't	Days for Clinical Recovery	Physical Condition	Microscopic Test
21	3	3	Strep.	2	12	200,000	100	33,000	100	1	3	Slight induration	+
	0	3	Strep.	1				1,000	5	During chronic stage 2 weeks later			—
22	1	1	Strep.	2	12	200,000	50	100,000	5	1	5		+
	0	1	Strep.	1				5,000	25	During chronic stage 3 weeks later			+
	0	1	Strep.	1				5,000	25	During chronic stage 1 week later			—
23	1	1	Strep.	3	12	200,000	20	50,000	5	2	10	Moderate induration	+
	0	1	Strep.	1				1,000	1	During chronic stage 3 weeks later			—
24	2	2	Strep.	3	12	200,000	20	50,000	20	2	9	Moderate induration	+
	0	2	Strep.	1				1,000	5	During chronic stage 2 weeks later			+ in 1
	0	1	Strep.	1				1,000	5	During chronic stage 1 week later			—
25	4	4	Strep.	6	12	200,000	50	25,000	25	3	21	Moderate induration	+
	0	4	Strep.	1				25,000	25	During chronic stage 4 weeks later			+ in 2
	0	2	Strep.	1				25,000	25	During chronic stage 1 week later			+ in 2
	0	2	Strep.	1				25,000	25	During chronic stage ½ week later			+ in 1
	0	1	Strep.	1				25,000	25	During chronic stage ½ week later			—
26	1	1	Strep.	2	12	200,000	50	100,000	5	1	4		—
27	2	2	Strep.	4	12	200,000	50	50,000	25	0	0	Dead on 3rd day.	
28	1	1	Staph.	2	12	200,000	50	100,000	25	1	4		—
29	2	2	Staph.	4	12	200,000	25	50,000	5	2	5	Moderate induration	—
30	2	2	Staph.	3	12	200,000	25	50,000	5	1½	7	Slight induration	—
31	3	3	Staph.	2	12	200,000	25	33,000	5	1	3		+
	0 gangrenous	3	Staph.					33,000	5	During chronic stage 1 week later			—
32	4	4	Staph.	4	12	200,000	25	25,000	50			Dead on 3rd day.	
33	4	4	Staph.	2	12	200,000	25	25,000	5	1	6 in 3 quarters 4th quarter blind		

TABLE III.—THE TREATMENT OF SEVEN CASES OF INFECTIOUS ACUTE SYSTEMIC MASTITIS WITH A COMBINATION OF PENICILLIN AND SULFANILAMIDE.

Outcome	
Days Before	

32	4												
33	4	4	Staph.	4	12	200,000	25	25,000	50	5	During chronic stage 1 week later		
		4	Staph.	2	12	200,000	25	25,000	5	1	6 in 3 quarters 4th quarter blind		

TABLE III.—THE TREATMENT OF SEVEN CASES OF INFECTIOUS ACUTE SYSTEMIC MASTITIS WITH A COMBINATION OF PENICILLIN AND SULFANILAMIDE.

Case No.	Clinically Affected	Quarters Infected	Microscopic Test	Two Penicillin Treatments Intravenously	Infusion	Sulfanilamide Grains per lb. per Day	Sulfanilamide Doses per Day	Outcome: Days Before Improvement	Outcome: Days Before Clinical Recovery	Outcome: Physical Condition	Outcome: Microscopic Test
34	2	2	Strep.	200,000	100,000	900gr 1st day	3	4	14	Moderate induration	+
						600gr 2nd day					
						300gr 3rd day					
	0	2	Strep.		1,000 in 5cc—treated during the chronic stage 3 weeks later						−
35	1	1	Strep.	100,000	100,000	900gr 1st day	3	2	6		
						600gr 2nd day					+
						300gr 3rd day					
	0	1	Strep.		5,000 in 5cc 4 weeks later						
	0	1	Strep.		5,000 in 5cc 3 weeks later						+−
36	4	4	Strep.	200,000	25,000	900gr 1st day	3	0	0	Dead on 5th day	
						600gr 2nd day					
						300gr 3rd day					
37	1	1	Staph.	200,000	100,000	900gr 1st day	3	2	4	Slight induration	−
						600gr 2nd day					
						300gr 3rd day					
38	3	3	Staph.	200,000	33,000	900gr 1st day	3	2	8		
						600gr 2nd day					+
						300gr 3rd day					
	0	3	Staph.		33,000 per quarter in 5cc 1 week later						
39	2	2	Staph.	200,000	50,000	900gr 1st day	3	2	5	Slight induration	−
						600gr 2nd day					−
						300gr 3rd day					
40	1	1	Staph.	200,000	100,000	900gr 1st day	3	4	14	Moderate induration	+
						600gr 2nd day					
						300gr 3rd day					
	0	1	Staph.		1,000 per quarter in 5cc 1 week later						−

immediately following an attack of acute mastitis. Similarly, the cases presented in Tables II and III recovered with udder infusion treatments of 1,000, 25,000 33,000, 50,000, or 100,000 units of penicillin. The smaller amounts of penicillin yielded as good results in these cases as did the larger doses. These amounts of penicillin were administered in 5, 25, 50, or 100cc amounts of sterile water per quarter with equal effectiveness. This allows of a dosage as low as 1,000 units per quarter and as high as 100,000, since the drug is relatively non-irritating to udder tissue. The size of the infusion can be determined by the capacity of the equipment at hand.

Two cases of streptococcic mastitis that were refractory to penicillin treatment were encountered in this study. The first case was a five-year-old Guernsey cow, weighing approximately 800 pounds with an attack of acute local mastitis, caused by streptococci, in the right rear quarter. Sulfanilamide was administered by mouth in four equally divided doses per day at the rate of 800 grains for the first day, 500 the second and 400 each on the third and fourth days. The acute, local mastitis persisted so penicillin treatment was started. Seventy-five thousand units were infused into the right rear quarter at 5:30 p.m., followed by 75,000 units at each of three infusions made on the next day at morning, noon, and night. The quarter remained infected despite this treatment. Three more infusions of 75,000 units of penicillin each at four-hour intervals were administered one week later, but the infection persisted. Penicillin treatment was then abandoned since it appeared that this Streptococcus was penicillin-resistant.

To determine whether this infection, caused by a "penicillin-resistant" organism, might yield to another antibiotic, tyrothricin therapy was started. Thirty cc of a solution containing 2mg per cc or 60mg of tyrothricin* were infused into the right rear quarter one week after the cessation of the penicillin treatment. The milk from this quarter became slightly flaky but the infection remained. Two days later 60cc or 120mg of tyrothricin were infused into this quarter. The milk remained flaky and since the infection persisted an infusion of 150cc or 300mg of tyrothricin was administered. A mild inflammation resulted in the infused quarter. The milk was "gargety" for one day followed by flakes for three more days but the streptococcus infection remained. Four

*The tyrothricin was supplied through the courtesy of Sharp and Dohme, Philadelphia, Pa.

days after the last previous treatment another tyrothricin infusion of 150cc or 300mg was made. Flakes were evident in the milk for the following four days. Repeated bacteriological checkup revealed that the infection had been destroyed. This cow has since remained free from infection as revealed by six tests at monthly intervals.

The second case is interesting because one quarter continued to harbor the Streptococcus infection despite repeated penicillin treatment. The treatment consisted in three injections each of 25,000 units of penicillin at four-hour intervals followed in one week by eight daily infusions of 100,000 units. This quarter was then treated by infusing 150cc or 300mg of tyrothricin into this quarter. The quarter became slightly inflamed and the milk flow was reduced approximately 25%. This persisted for three days and was accompanied by a few flakes in the milk for four days. The infection was eliminated and the cow has remained negative to bacteriological tests for the past eight weeks.

Summary

Penicillin in an effective treatment for acute local and acute systemic mastitis caused by streptococci or staphylococci. Clinical recovery is usually not accompanied by bacteriological recovery when streptococci are involved but usually does occur where staphylococci are involved. Repeated udder infusions were required to yield clinical recovery in acute local mastitis.

Two hundred thousand units of penicillin given intravenously and 100,000 units into the involved quarter or quarters, repeated at 12- or 24-hour intervals, usually resulted in prompt clinical improvement and was followed by clinical recovery in acute systemic mastitis. To obtain bacteriological recovery, the infections remaining were treated during the chronic stage of the disease.

Two injections of 200,000 units of penicillin administered intravenously and 100,000 units into the involved quarter or quarters at 12-hour intervals, followed on successive days by one, two-thirds and one-third grains of sulfanilamide per pound, effected clinical recovery almost as rapidly as where the penicillin treatments were repeated many times.

Two cases of streptococcic mastitis resistant to repeated penicillin injections were treated successfully by the infusion of 150cc or 300cc of tyrothricin into the involved quarter.

Literature Cited

1. Bryan, C. S., R. E. Horwood, and C. F. Huffman. A preliminary report on penicillin in the treatment of chronic streptococcic mastitis. *Vet. Med.* 40:3, pp. 87-89. 1945.

2. Klein, L. A., D. W. Crisman, and J. W. Moor. Effect of local injections of penicillin on staphylococci in the cow's udder. *Am. J. Vet. Res.* 6:18, pp. 3-8. 1945.

3. Bryan, C. S. The microscopic diagnosis of infectious mastitis. *Vet. Med.* 30:4, pp. 149-156. 1935.

A clinical examination was made of each cow before and after treatment and milk samples collected for bacteriological examination—microscopic tests were made to determine the presence or absence of infection and to indicate the type of infection

Abortion in Swine*

IN swine as in other animals, certain severe general infections may cause abortion in the pregnant female. Examples of this are abortions in attacks of hog cholera and in swine influenza. Such abortions, however, are incidental to the general infection and their cause is not likely to be mistaken. Swine abortion as an entity, i.e., due to a specific attack on the reproductive organs, is, in swine, due in many cases to an invasion of these organs by the *Brucella suis*.

There are three types of Brucella. In 1887 Sir David Bruce, a medical officer in the British Army, discovered the melitensis type—the strain that normally infects goats. Bernard Bang of the University of Copenhagen, discovered the abortus or bovine type in 1896. Jacob Traum, then with the Federal Bureau of Animal Industry isolated the suis or porcine type in 1914. Traum recognized the suis organism as being a strain of the Brucella genus but it was not till 1918 that the relationship of the abortus and melitensis strains was recognized. This discovery was made by Alice Evans, then with the Federal Bureau of Animal Industry.

Man is susceptible to all three of these strains of Brucella. The horse, sheep, laboratory animals and various other domestic and wild animals, including birds, are capable of being infected. Both cattle and goats are susceptible to natural infection by all three types of the organism, but swine are naturally infected only by the suis type.

There are no statistics as to the general incidence of brucellosis among swine. In some areas, it is known to approximate 20% of the herds. The best guess is that between 1 and 3% of all the swine in the country are infected.

The economic importance of swine brucellosis varies widely. In commercial herds, the loss is probably seldom important. In purebred herds, the loss is high and very important to the owner. Infection in purebred herds is important also to the swine industry, because of the possibility of wide dissemination of the infection from such centers.

On the whole, it is not the economic loss from swine brucellosis but the public health aspect that is most important. In the whole country there is a large number of cases of undulant fever in man, and the incidence is increasing year by year. What percentage of these cases is due to the porcine type of the organism is not known, but statistics gathered in Iowa, the leading state in swine production, show 75% of the cases to be due to the suis type. Curiously enough, in Alabama, which is not an important swine producing state, a survey showed almost the same percentage—72%—of the cases of undulant fever to be due to the swine organism. Every epidemic of undulant fever that has occurred in this country, so far, has been due to the suis type of the organism, in most, perhaps all instances due to the infection of cattle and contamination of raw milk with the swine type of the organisms. A recognized public health authority has stated that wherever the milk supply of a community is importantly infected with *Brucella suis* and the milk is consumed without pasteurization, the stage is set for an epidemic outbreak of undulant fever. The suis type, as is well known, is more infective for man than the abortus type and causes a more severe form of the disease.

Brucellosis in cattle is much better understood than is the same disease in swine and perhaps the best way to discuss the disease in the latter animal is to compare it with the infection in cattle. Its course and effect in these two animals differ in many respects.

In cattle, Brucella infection by any route, promptly becomes localized in the uterus or the udder. Swine develop first a bacteremia when infected with brucellosis. The organisms usually circulate in the blood for 30 to, in extreme cases, 120 days. After this period of bacteremia, the organisms become established in practically all tissues. I have seen it in nearly every tissue, but perhaps lymphatic tissue constitutes the primary location of the organisms.

In cattle, brucellosis rarely causes abortion earlier than the fourth or fifth month of gestation; in swine, abortion, when it occurs, may take place any time from the 21st day of gestation onward. In cattle, abortion is easily recognized; in swine, it is extremely difficult to discover, except as one happens to be present when the act occurs.

Lameness rarely occurs in cattle as a result of brucellosis infection, it is common in infected swine. It should not be understood, however, that all lameness in infected herds is due to Brucella infection, for such, of course, is not the case. Swine erysipelas, pyogenic arthritis and other causes of lameness may also be present in the herd, independent of or along with brucellosis.

Little is known as to the importance of brucellosis as a cause of sterility or temporary infertility in swine. We don't know how many matings are normally required for conception in the sow. Thus, in a herd of cattle, if the

*Notes from address by Dr. L. M. Hutchings at the 40th annual meeting of the Mississippi Valley Veterinary Medical Association, Galesburg, Ill. Nov. 15-16, 1945.

ratio of matings to conceptions is as low as 1.5 to 1 we regard the breeding efficiency as good, but in swine, we do not know how many conceptions to expect from a given number of matings. In some purebred herds, in which Brucella infection was general, there have been as many as 39% of the sows that failed

One of the infected boars had an abscess in the testicle

to conceive as a result of four or five matings.

Swine brucellosis shows a great tendency to disappear in the individual animal, i.e., the animal no longer reacts positively to the agglutination test. However, many such animals are reinfected readily by experimental exposure.

Young pigs are readily infected with brucellosis; calves are not easily infected. Boars seem to be more susceptible to infection than bulls. The incidence of brucellosis is probably higher in boars than in gilts. Transmission of brucellosis in swine is principally from animal to animal and through oral or genital infection. Contaminated premises is a minor factor in spread of the disease. The organism dies quickly in the soil or anywhere outside the body of a living animal, except perhaps in contaminated streams. We have found that Wabash river water will support the growth of virulent *Brucella suis* organisms under various experimental conditions.

Discharges from the genital tract of infected sows is an important means of spreading the infection. Usually such discharges clear up in a week to 10 days after abortion or farrowing, but the discharge has been noted to continue in one instance for a period of 56 days. That case, however, was quite exceptional. On the average a vaginal discharge clears up more quickly in sows than it does in cows.

Six infected boar pigs, all reactors, were kept to six months of age and then trained to work on an artificial vagina. All six of these boars eliminated Brucella organisms in the ejaculate at some time during the study. One had an abscess in the testicle, the other five appeared normal. Brucella organisms were found in 63 of 92 ejaculates from these six boars. One of these has not reacted to agglutination test for eight months, yet his ejaculate regularly contains Brucella organisms.

In the diagnosis of swine brucellosis, the same test and the same antigen are used as in bovine brucellosis, but there is a great deal of difference in reading the test, i.e., in interpreting the reaction. The test is not as efficient in picking out infected swine as it is in cattle. Only about 86% of the animals with organisms circulating in the blood stream react. The percentage of swine in which the infection has become localized or quiescent that fail to react is unknown. We have had the experience of having swine with large abscesses containing pure culture of *Brucella suis* show a negative reaction for months at a time or perhaps never react positively at all. As a herd test, however, the agglutination test is dependable and a valuable diagnostic measure. If any animals in the herd react positively, the chances are a considerable percentage will so react and the entire herd should be regarded as infected. It is not safe, for example, to purchase a boar from an infected herd on a basis of a negative test of the animal. If one must take such a boar, he should be quarantined for at least two months and tested

Doctor Hutchings drawing blood from the anterior vena cava for brucellosis test

at monthly intervals during that period. Only after three consecutive negative tests would it be reasonably safe to put him in a negative herd. Infected boars appear to react in a larger percentage than do sows, so the hazard in buying female stock from an infected herd may be even greater than jn buying boars and the same precautions should be observed.

The veterinarian who tests a herd of swine

for brucellosis must use good judgment in interpreting the test. Tests are usually made in dilutions of 1:25, 1:50, 1:100, 1:200 and 1:400.

If there are no positive reactions at dilutions greater than 1:25 and only a few of those, the herd is to be regarded noninfected. If there are reactors in the higher dilutions, all reactors, even incomplete reactors at 1:25 are to be regarded as infected, and as stated previously, animals in the herd that do not react positively in any dilution are to be regarded with suspicion.

Sixty pigs were exposed to Brucella infection by various means. Fifty-nine of them showed a rise in agglutination response and organisms were recovered from the blood of 49 of them. Twenty-three of the 49 were bred and all farrowed normally. No organisms were found in the uterine discharges nor in the blood of the pigs. Nineteen of the 23 were bred again and again exposed to the infection. This time one sow aborted and organisms were recovered from the blood of 13 including the one that had aborted.

The method adopted to eradicate brucellosis from a given herd depends pretty largely upon the purpose for which the herd is maintained. If it be an ordinary commercial herd, the owner is likely to regard the infection lightly and to take little interest in getting rid of it. It should be pointed out to him that the infection constitutes a danger to his own health and to all who take part in caring for the herd including the veterinarian who vaccinates them for the prevention of cholera or supplies other medical service, and even to butchers who work in the packing house where his animals are slaughtered. Furthermore, that infection may spread to his cows and cause great loss and, in addition, infect the milk and endanger the health of his family and all others who consume the milk raw. If all this is not reason enough to get rid of the infection, he may be told the probability remains that the disease is costing him more than he realizes. Gilts frequently fail to conceive as a result of the infection or abort unnoticed thus reducing the breeding efficiency of the herd.

The best method of eradicating the disease from a commercial herd is to send all animals to slaughter, at a plant having inspection, as rapidly as they can be fitted for the market and start a new herd with noninfected stock. Since at present only a small percentage of herds are infected, this is not difficult, providing reasonable care and good judgment is used in selecting the new foundation stock.

The owner of a purebred herd will usually elect to build a disease free herd from the stock he has. If the incidence of the disease is low in his herd, a rare condition, he may be able to accomplish this by repeated testing and elimination of the reactors. But this plan won't always work, and it usually takes longer than it does to build a clean herd from his young stock.

Usually when brucellosis is present in a herd, a large percentage of the animals are infected. In a purebred herd in this condition, the best method of eradicating the disease is to breed all the sows as usual regardless of whether or not they are reactors. Wean the pigs at eight weeks of age, select the breeding stock, with some allowances for culls later, and remove them from the remainder of the herd to clean premises. The old herd should then be prepared for market and disposed of when ready.

The new herd should be tested when separated from the old herd and tested three more times to breeding age, sending any reactors, of course, to the old herd. In this way, a large, highly-infected herd was completely freed of the disease with only about six-months interference with the breeding operations. This plan is more adaptable in small than in large herds; but even in the large herd, unless the breeder is willing to sacrifice strains and families and start all over, it offers perhaps the best chance for ridding his herd of brucellosis.

Veterinary Service in New Caledonia

By CAPTAIN SEYMOUR LUSTIG, VC
New Caledonia

AT almost any overseas post the Army veterinarian has an interesting and diversified position. This is especially true here in New Caledonia.

Outstanding among the early major veterinary problems was the inspection of canned subsistence of meat and dairy origin. This, I believe, was true at all tropical bases. The tactical situation at that time did not allow for well planned storage areas and at times even simple dunnage and cover was lacking. This, of course, caused a high percentage of spoilage and it became the problem of veterinary personnel to inspect each can to determine whether or not it was fit for issue to the troops.

All canned foods of animal origin were inspected and those considered fit for shipment to advance bases were stored separately on the recommendation by the Veterinarian of the station. The remainder were inspected and kept for issue at this base. A 30-day supply was held ready and as depleted was built up again. In this way, all canned foods of animal origin were inspected within 30 days before issue.

Through the efforts of the Veteriniarian and the Quartermaster, new methods of lacquering cans, new forms of packaging, and new ideas about tropical warehousing were developed to reduce the percentage of spoilage of canned subsistence to a minimum.

Prior to shipment to forward areas, all meat and dairy products are inspected by the veterinary service and they are again given a veterinary inspection on receipt at the advance base. This includes fresh frozen foods as well as canned.

The veterinary officer is also concerned with the sanitation and storage of all fresh frozen foods of animal origin at the various refrigeration and cold storage plants.

Since it is impossible to supply fresh milk to the troops in the tropics and sub-tropics, ice cream is served to replace this deficiency in the diet. The Army does its best to insure an adequate supply of such a nutritious and well liked food. The Quartermaster operates a large ice cream plant at this base and the individual unit Post Exchanges operate a large number of smaller ice cream manufacturing plants. The sanitary operation of these installations comes under the supervision of the Veterinarian. While credit for the palatability of the product goes to the manufacturer, the Veterinarian safeguards its production. At this base, inspection of the civilian ice cream plants which sell ice cream to the U. S. Armed Forces is also conducted by the Veterinarian. Inspection of all the civilian eating establishments is carried out by Sanitary Corps officers.

The Quartermaster farm program includes a large chicken farm, to insure an adequate supply of fresh eggs for the hospitals. Monthly inspections of this installation are conducted by the Veterinarian. The climate of New Caledonia is well suited for such a project and except for one outbreak of roup there have been no serious outbreaks of disease in the quartermaster flock.

Veterinary inspection of subsistence supplies arriving at an invasion base

Fish abound in the waters off New Caledonia and the Army takes full advantage of this fact by maintaining a fleet of small fishing vessels to supplement the Army ration. These vessels have refrigeration facilities aboard and all fish are given a veterinary inspection immediately before being issued to the troops. Thus the safety of the product is assured and the soldiers' menu is varied.

There is a veterinary officer assigned to the port at this base to make the necessary sanitary inspections of the refrigeration and holds of ships that dock here carrying foods of animal origin. He also supervises the movement of any animals that may come through this base.

The various horse and mule outfits that have been stationed here from time to time have had veterinary personnel assigned to them. Outstanding among the diseases encountered

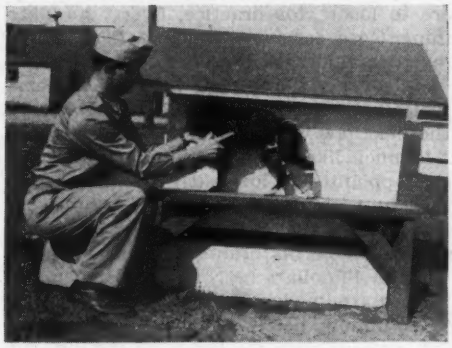
by these units were thrush, separation of the sole, arthritis, and a fungus type of dermatitis. Some cases of internal parasites were encountered. The most important of these were *Hebronema megastoma*, Gastrophilus larvae, and strongyles. The fly, *Hippobosca maculata*, is prevalent here and causes considerable local irritation to the animals.

There was at one time a large detachment of War Dogs used here. An excellent kennel area was built for them and a dispensary, as complete as possible, was constructed. Of interest is the high prevalence of heartworms (*Dirofilaria immitis*), among both the war dogs and the local canine population. Some cases were treated but upon autopsy they still showed extremely heavy infestation with live microfilaria. Doctor Verges, chief of the French Colonial Veterinary Service on New Caledonia, told me that he knew of no cure, but that sodium arsanilate (atoxyl), 1cc each day for

Canine heart opened to show mass of *D. immitis* in right portion. X 1/3

six days, injected sub-cutaneously or intramuscularly, the whole series being repeated every three months, will suppress clinical symptoms. I have had no experience with this treatment and report it only as a matter of interest.

Besides the regular duties, there are always the certain official small jobs that the Veterinarian is asked to do. The American soldier is famous for his love of pets and there is a never ending stream of sick dogs for examination and treatment. Distemper is common although copious discharges from the eyes and nose are infrequently seen. However, a great many of the cases are followed by nervous symptoms. There has never been any report of rabies occurring in the South Pacific, nevertheless the question was thoroughly investigated after several American servicemen were bitten by local dogs. Laboratory investigation, utilizing both smear preparations of the brain and animal inoculation gave negative results



The American soldier loves his pets—there is a constant stream of sick dogs for examination and treatment

for rabies. Eclampsia is very common and the usual run of dog diseases are seen. Indicated surgical operations are performed where possible.

Deer hunting is excellent on New Caledonia and hunting parties frequently augment the regular Army rations with venison. The carcass is inspected by a veterinarian prior to its consumption.

Far from going out with the horse, the present day Army veterinarian is assuming many important military duties.

Veterinarians Needed

Veterinarians are needed in the Meat Inspection Division, U. S. Department of Agriculture. The starting salary is $2,320 per annum in the P-1 grade. A veterinarian whose services are found satisfactory is eligible for promotion to the P-2 grade within six months. The salary range in this grade is from $2,980 to $3,640 per annum with automatic promotions of $110 per year from the minimum of $2,980, provided his services are satisfactory. His experience before or while in the Army may be sufficient to gain an appointment at the P-2 grade with a starting salary of $2,980. Those interested in Government employment with the Meat Inspection Division should fill out Standard Form No. 57, which may be secured by writing the Personnel Division, Production and Marketing Administration, or from your local Civil Service office, and forward it to the Chief Personnel Officer, Meat Inspection Service, U. S. Department of Agriculture, Washington 25, D. C.—*Army Med. Bul.*

Why Rush Into Practice?

By E. T. BAKER
Moscow, Idaho

THE writer has received many letters and half a dozen personal visits from veterinarians returning from military service who desire to locate for practice. Every graduate running loose seems to imagine that unless he chooses a location at once, if not sooner, he will never get another chance. He seems to feel all the good places will be gobbled up in the next few weeks, or months, at latest.

It is much like a young friend of mine who was disappointed in love with the first girl he ever went with. He confided his troubles to me, and full of sympathy, I advised him to go ahead and blow his brains out, but I offered to bet him 10 dollars he couldn't hit them. So he waited around for awhile and, much to his surprise, found there were a few girls left.

This present rush for locations reminds me of the recent Christmas season when everyone tried to go somewhere at the same time. From all reports a slight traffic jam occurred.

To use still another simile, think of the women running around in fur coats which cost $500 the week before Christmas which could have been purchased for $300 the day after. Of course, many of these gals who are short and fat resemble a pregnant muskrat when they wear a fur coat but they are happy and, after all, that is what counts.

Property Values

Of course, the worried young veterinarian can rush in now and buy a $5,000 home for around $9,000, and build a $3,500 hospital in a small town for $10,000, or even purchase a $12,000 farm for $20,000. However, in a couple of years or so when prices are again normal he is due to worry some more.

Even this Merry Yuletide found us absolutely butterless. In our town, with two creameries, our sturdy citizenry did not have enough butter to baste one little midget turkey.

Three years ago we had seven dairies in our immediate vicinity with over 300 cows. In addition, dozens of farmers kept from 5 to 10 cows, having most of them freshen in the fall for winter milk and cream. My dairy practice was excellent.

Our dairymen were then paying around $12 for hay; $22 to $25 per ton for grain, and $6 for baled straw. They were receiving 12 cents per quart for milk.

Within a year, hay had jumped to $26; grain to $50 a ton; and even baled straw sold for $20 a ton. The price of milk was raised to 13 cents a quart. Five dairies quit, leaving only two small ones which produce most of their own feed. Of over 600 cows that were kept by farmers around the town perhaps 150 are left.

A Typical Example

Farmer A had 320 acres of good land and two boys, aged 22 and 18, to help him. They had 12 milk cows; 35 beef cattle; 14 sows; about 60 shotes; four horses and several hundred chickens.

Mr. A. had asthma so bad he could not work among the cattle or horses, so he slopped the hogs and took care of the machinery, while his wife handled the milk and chickens. The boys did the rest of the farm work, and they had a good going business. My veterinary fees from this one place ran from $50 to $75 per year.

Early in 1943, the oldest boy was drafted, going to the European sector. They sold off enough stock so the remaining boy could handle it.

In the late fall of 1943, while out on a call to this farm, the younger son said to me:

"Doc, I'm agoin' to join th' Marines. I ain't agoin' to have people say I stayed home with Mama during the war."

"Well, Bob," I replied, "I know how you feel, and I admire you for it. You're doing a good job here, but what will the old folks do?"

"That's th' tough part, Doc, but they'll just have to sell off the stuff, for I'm agoin'."

His parents asked me to try to influence him to stay home, but I said:

"If I were in his place I'd go. Then, after the war when people and especially girls ask him what outfit he was in, he won't have to explain that he stayed home and helped Daddy."

So the boy left soon after and went through some mighty rough stuff down in the South Pacific, but he came through without a scratch. The old man sold off all but one cow, which his wife milks. He kept one sow and gave the horses to a mink farm. He figures on having most of his farm in summer fallow or grass. My veterinary bill for this year was just one dollar for the lone calf they have, which happened to get the scours.

Multiply this by thousands all over the country, and the returning veteran will begin to see we are going through a period of reconversion right now and it may continue for a couple years.

The last three years our harvests have been taken care of by old men, women and high school kids. Even a ten-year-old farm girl drove a truck all summer and, except for the heavy loading, did a man's work.

A Personal Experience

As I like to tell my clients, the first year I was in practice I made less than $50,000. The second year I made under $100,000, and the third year I started on my first million.

However, during those first three years I never lost a case, because we always returned the bottles.

Half a dozen farmers broke their legs running to our house to pay their bills, and I was so busy I didn't have time to cash any checks, so we used them to light the kitchen range.

If I had a patient I could not handle without kid gloves I referred it to the college clinic. I was like the young dentist who, when faced with his first impacted wisdom tooth case, asked his office girl to call Dr. Vanilla, whose office was next door.

"Why?" she inquired.

"Because I'll let Vanilla extract," he answered gaily, as he began arranging the necessary instruments.

Life in "them days" was carefree and has always remained so as far as I am concerned.

The Present Situation

But to return to sterner questions, the present situation is the parturient period of readjustment. It is going to take several years for the calf to be born, and in the meantime a lot of political bull will be thrown around.

People on farms are tired. Many of my clients tell me they are going to take it easy for a while. They are not going to milk cows seven days a week, or slop hogs on Sunday morning now that the war is over. Most of them are out of debt, with money in the bank and war bonds in the safety vault. Many of their boys and girls, returning from the services, are going to complete their education in some college. Consequently, veterinary practice will not be too brilliant for the next couple years. My suggestion to returning veterinarians is to pick up a salaried job,, or spend a year in college, or go hunting or fishing, or see the country for awhile.

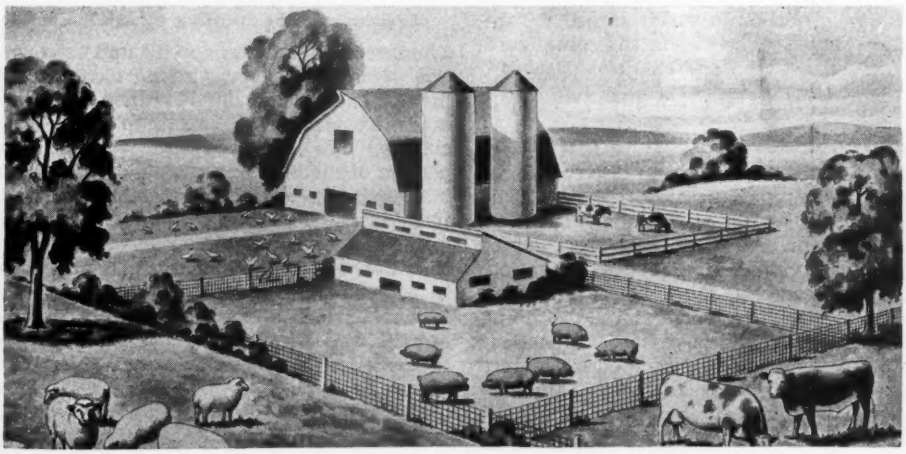
There are perhaps 5,000 practitioners from 50 to 70 years of age, and these will be passing out of the picture in a very short time. The only thing that keeps many in the same location is that they cannot buy property elsewhere to retire, except at an excessive price.

Within the next few years, hundreds of new locations will open with new people and with new hopes. These newcomers will be fired with agricultural ambitions and will make good clients.

Property values will become adjusted and, instead of a man who rushed in and bought a $6,500 home for $12,000, the person who looks over the situation first will be able to start in at a more moderate level. Equipment will be back on the market and things will revert to a pre-war status.

Farmer A's two boys will be back on the farm about 1947 and, by 1950, they will have the old place re-stocked as it was in 1940, and be calling "Doc, come out quick as you kin."

A new and perhaps very prosperous era will sweep over the good old U.S.A., which has never failed us yet. However, we may see a little cloudy weather in the very near future. Right now, everything is in an uproar, just like the traffic jam before Christmas. It will quiet down in due and ancient form, so why not stay out of it—take it easy. You won't be sorry.



Courtesy Pitman-Moore

"Farmer A's boys will be back on the farm and by 1950 have the old place restocked as it was in 1940

Clinical Reports

Posterior Paralysis in a Dog

Subject — A black and tan, smooth-coated, male German shepherd, eight years of age, was treated for paralysis of the hind quarters January 25, 1945.

Anamnesis.—The owner complained that the lameness had started in the left hind leg two months previously. A short time later the other leg became affected and within a month the dog could not stand upon either hind leg.

About one year before the attack the animal was hit by an automobile, but no external injury was noticed at the time.

Symptoms.—The dog was alert and in excellent condition, but unable to stand owing to paralysis in the hind legs. No deformities of the posterior parts of the dog could be detected by palpation. Upon fluoroscopic and x-ray examination, however, an exostosis was observed on the ventral surface of each of the last two thoracic and first three lumbar vertebrae.

Treatment.—The dog was observed, exercised and given a sodium bicarbonate enema each day for a week. No change could be detected in the condition of the dog.

Post-mortem Examination.—As the prognosis was hopeless, euthanasia was performed by injecting 5cc chloroform into the atlanto-occipital space of the vertebral canal. No lesions could be observed at the time.

Upon maceration of the vertebrae, however, an exostosis was found to be extensive on each of the last two thoracic and the first three lumbar vertebrae which caused paralysis due to impingement upon the spinal cord.

LA VERNE HAROLD

Bismark, N. D.

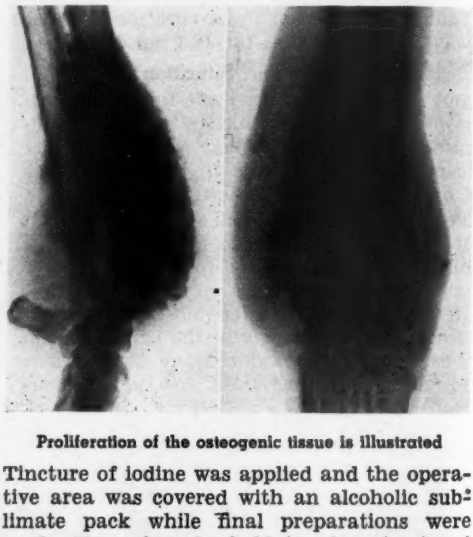
Osteogenic Sarcoma in Great Dane

A seven-year-old great Dane bitch was presented for examination October 6, 1944. The symptoms first noticed were a slight lameness and swelling on the distal end of radius of the right fore limb. An X-ray examination, six weeks previously, by a veterinarian revealed a developing sarcoma at the distal end of the radius involving the radio-carpal articulation. The application of compound tincture of benzoin had been recommended and followed with no indications of improvement.

Symptoms were posterior paresis and lameness in the right foreleg. An X-ray examination was made which revealed further proliferation of rarefied osteogenic tissue as shown in the illustration. The paresis of the posterior extremities was diagnosed as hypoparathyroidism and injections of parathyroid extract resulted in marked improvement of locomotion within two weeks.

On October 19th another X-ray examination of the fore limb indicated continued and further proliferation of the osteogenic tissue. Due to the incurable nature of the condition, amputation was recommended and acceded to by the owner.

One grain of morphine sulfate was administered as a basal anesthetic, followed by 10cc of nembutal injected into the external radial vein. The dog was confined in lateral recumbency on the operating table and the operative area was shaved from the scapulo-humeral to the humero-radial articulation. The skin was thoroughly cleansed with soap and water followed by alcoholic sublimate.



Proliferation of the osteogenic tissue is illustrated

Tincture of iodine was applied and the operative area was covered with an alcoholic sublimate pack while final preparations were made. Four shrouds, held in place by towel clamps, were employed to cover the lower portion of the limb and surrounding area. The instruments used were sterilized by boiling for 10 minutes.

The incision through the skin was made near the distal end of the humerus extending down through the biceps brachii, brachialis, tensor fasciae antibrachii, triceps brachii, brachio-radialis and through the point of origin of the extensor carpi radialis and flexor carpi ulnaris.

The hemorrhage was controlled by use of Ochsner's forceps and Kelly's fine point forceps on the smaller vessels. It was necessary to ligate the brachial vessels and some of their

larger collateral branches. The muscles were reflected back from the bone to the middle of the humerus which was divided with a bone saw. Six interrupted sutures of non-absorbable material were placed through the skin and a sulfanilamide pack, generously covered with a cotton pad, to provide maximum protection was bound in place by a many tailed bandage. The owner was advised to replace the bandage every 48 hours for a period of two weeks and keep the stump padded for six weeks to prevent possible injury; since the owner was a dentist he was competent to administer the proper care following the operation.

The tumor was sectioned and examined both macroscopically and microscropically. Gross examination revealed no definite periosteum or demarcation between the shaft of the bone and the tumorous growth. In the absence of the definite periosteum, small irregular areas of osteogenic tissue extended out into the soft tissue as shown in the illustration.

Microscopic examination revealed the changes to be typical of the osteogenic sarcoma. At the periphery of the growth there were large edematous areas composed of fibrin strands, segmentors (polymorphonuclear leucocytes), phagocytes and cellular débris. There were likewise scattered areas of embryonic osteogenic structures and numerous mitotic figures indicating the malignant nature of the condition. Nearer the shaft of the bone the outstanding cellular structures were embryonic connective tissue, fibroblasts, osteoblasts, osteoclasts, osteocytes and boney spicules in a more definite formation.

K. C. CARLSON

North Hollywood, Calif.

Preparation of Skeletons

The value of macerated skeletons is not fully realized nor is the ease with which they may be prepared generally appreciated. A skeleton is valuable not only for display purposes, but for anatomical reasons. A small amount of time spent observing the locations of the various foramina of the skull will facilitate nerve blocking for dental work and it assists in orienting radiographs of fractured bones. The owners of injured animals are keenly interested in them and appreciated greatly an explanation elucidated by the use of a skeleton of that species. The value of a skeleton is much greater than the time and small expense required for cleaning and maceration of the bones.

Skeletons may be classed as ligamentary and disarticulated, according to the method of attachment of the bones. Ligamentary skeletons are those in which the bones are held together at the joints by the natural ligaments. This type of skeleton is useful in the case of small animals up to the size of a cat or a dog of medium size. Disarticulated skeletons are those in which all ligamentary attachments are removed. Disarticulated skeletons are of greatest value in large animals or for the study of the individual bones.

The subject for maceration should be chosen with some care as fusion of the bones at the epiphyseal cartilages is necessary, i.e., the animal should not be too young. In case the separate bones of the skull are desired, it is well to start with a young specimen in order that the bones can be separated easily.

Numerous processes have been devised for freeing bones of attached tissues. Some of these methods are very simple and inexpensive. The following method is used with some degree of success in cleaning small skeletons. Dermestid beetles,[1] *Dermestis marmoratus*, are often used by biologists for preparation of skeletons. A stock of dermestid beetles may be obtained by picking them with a pair of forceps from beneath almost any partially dried carcass. The skeleton is prepared for the beetle by removing the skin, viscera, and most of the flesh and allowing it to dry from one day to a week. The partially dry skeleton and beetles are placed in a jar or other impervious container. A one-inch band of vasoline should be smeared around the inside top of the jar and the top covered with a piece of cloth to prevent escape of the larva and the adult beetles. The beetles are then allowed time to consume the flesh, and leave the skeleton, like Jack Spratt's platter or Old Mother Hubbard's cupboard.

To prepare a skeleton by maceration it is advisable to remove as much flesh as possible from the bones. Remove all viscera, flesh and tendons possible without damaging the tiny ligaments which will later aid in assembling the skeleton. The eyes should be removed, and as much of the brain as possible, through the foramen magnum. The removal of the remaining flesh may be completed by scraping the bones with a sharp knife and clipping around the joints with curved scissors. Some care should be exercised to prevent damage to sesamoid bones and short ribs.

Chemical maceration is widely used by those preparing large numbers of skulls and skeletons.[2] Place the roughly cleaned skeleton in a wide-mouthed jar or pan; cover with an ammonia bath consisting of eight ounces of household ammonia to each gallon of water. The bones are allowed to stand in this solution

[1] Hardy, Ross. *Trutox News*, 23:4. 1945.
[2] Kruse, William A. R., How to make skeletons. *Wards Natural Science Bulletin*, 27:4.

for three to six days, to remove the blood from the bones. The ammonia is then rinsed off with water and the bones placed on a slanting board which drains into a pan containing sodium hypochlorite bleach. It is necessary to wear rubber gloves while working with this bleach as it is irritant to the skin and destructive to clothing. The bones should be scrubbed vigorously with a long handled brush dipped in the bleaching solution. If too much bleach is used the ligaments will be destroyed. It is well to have a pan of fresh water near at hand for an occasional rinsing.

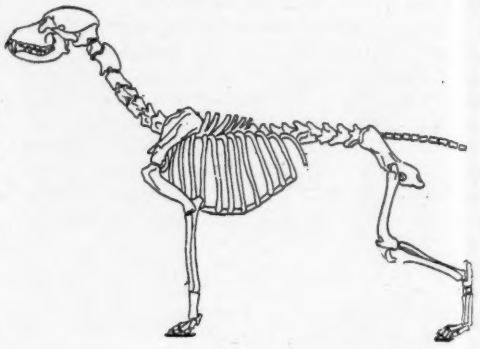
After thorough scrubbing with the bleaching solution, the skeleton should be rinsed thoroughly in fresh water and placed in a porcelain container. A hydrogen peroxide bath consisting of one part hydrogen peroxide and two parts of water is then poured over the bones and allowed to stand for 24 hours. This is the final bleaching. The bones are then dried.

Another method of preparing a disarticulated skeleton for purposes of comparison, renders the bones fairly white.[3] Place the roughly cleaned skeleton in water and soak until the blood is removed. The flesh and tendons may then be removed by boiling the bones in a solution of potassium carbonate (two heaping tablespoonfuls to one gallon of water). When the bones are free of flesh and tendons they are washed in warm water containing a little ammonia and spread out to dry and bleach in the sunshine.

Some advise immersion of the skeleton in a hydrochloric acid bath[4] (one part concentrated hydrochloric acid in 40 parts of water) for 12 hours, followed by rinsing in water and ammonia bath for 20 to 30 minutes to counteract the acid and halt maceration of the tendons. Usually carbon tetrachloride is used to remove fat from the bones and hydrogen peroxide to bleach them.

The following process has been used by Dr. W. M. McLeod, Head of the Department of Anatomy, Kansas State College, for a number of years. Doctor McLeod has tried numerous methods, but finds this the cheapest and most dependable. Place the roughly cleaned bones in a container, preferably earthenware or porcelain, and cover with cold water. Change the water daily until it is no longer stained with blood. The temperature of the water is then raised to 90 to 95° F., which favors bacterial action and causes digestion to take place rapidly. Skim off all debris or grease that rises to the surface, and change the water every two or three days to prevent undue stagnation. Continue this process until all the flesh falls from the bones. The vertebrae may be kept in their proper order by stringing them on a piece of stout fish line. The bones of each limb may be placed in coarse cheese cloth bags to prevent mixing of the bones of different limbs.

When the flesh and tendons have soaked loose and the bones are free from debris, rinse thoroughly with water. The bones are bleached for two or three days in 5% hydrogen peroxide solution or in a weak chlorine solution. This method of maceration is rather slow and odorous, but the bones thus treated are very clean and chalk white. The fat was not all deposited in the bones at one time and will not all come out in a few hours. The warm water used during the latter part of the soaking process helps greatly in removing the fat. No expensive chemicals are used by this process and little time is actually required.



Courtesy Dog News

A skeleton is valuable for display purposes

The process of mounting will be much easier if the bones are removed from the soaking water before the ligaments have all been digested. The tiny ligaments will then hold the bones in place and still be hardly noticeable.

Sometimes iron rust spots appear on the bones from impurities in the water. These may be removed by painting the spots with a strong solution of oxalic acid and water. The oxalic acid will decompose and corrode the bone surface so should be washed off thoroughly, immediately the rust spot has disappeared. If the soaking process is done in a metallic container with free metal surfaces, a black stinking residue is often formed. This residue is actually a combination of sulfur with the metal. This condition can be controlled by using containers with no free metallic surfaces.

After bleaching is complete and the bones have been dried, detached teeth, jaws, or

[3] Rowley, John, Taxidermy and museum exhibition, p. 211.
[4] Preparation of cartilagenous skeletons. *Trutex News*, Feb., 1932.

bones may be united with white absorbent cotton cut up fine with scissors and dipped in thick gum arabic and water. When dry the cotton and gum arabic keep their white color and in this respect are much better for joints and small artificial cartilages or ligaments than glue or other yellow gums.

The foregoing are only a few of the processes by which maceration may be accomplished, but they are as satisfactory as any where no special conditions have to be met. I feel that the value to be derived from a skeleton is far greater than the cost in time and money required for processing it.

MAURICE HULL

Linden, Mo.

Prolapse of Vagina Due to Proliferative Growth

March 26, 1945, a white, shorthorn heifer 13 months of age was brought in for treatment.

History.—Maxwallon Queen Bess 2172247 was calved Feb. 8, 1943. She was accidentally bred to a shorthorn bull Dec. 27, 1943, and calved Sept. 30, 1944. During labor laceration of the vaginal mucosa resulted from assistance by the owner, who later observed a partial vaginal prolapse when the animal was in sternal recumbency.

Symptoms.—Vaginal examination revealed a mass of proliferative granulation tissue on the lateral surface of the mucosa about four inches from the lips of the vulva. An attempt at surgical removal of the growth was advised and acceded to by the owner.

Treatment.—After five days of observation the animal was restrained in stocks for the operation. Ten cubic centimeters of a 2% solution of procaine hydrochloride was introduced epidurally between the last sacral and first coccygeal vertebrae with a two-inch, 16-gauge needle. The tail was pulled aside and tied to a string around the animal's neck. The perineal region was thoroughly washed with liquid soap and water and dried. A cotton plug was introduced into the anus to prevent fecal contamination of the operative area. Cotton saturated with a 1 to 1000 solution of bichloride of mercury in alcohol was applied to the perineal region for 10 minutes.

The lips of the vulva were retracted and the growth was pulled backward to the lips of the vulva. With continued traction of the growth, elliptical incisions through the mucosa were made around the tumor from anterior to posterior. By blunt dissection the growth was removed. The incision was closed by interrupted sutures of No. 10, 20-day chromic catgut. When the operation was completed, the cotton plug was removed from the rectum and the perineal region was again cleaned.

To prevent the prolapse from recurring, interrupted sutures of a double strand of umbilical tape were placed in the thick skin about two inches either side of the lips of the vulva. The two top sutures were placed a little above the superior commissure of the vulva. Large loops were left to pass tapes through. The two lower sutures were placed so they extended just below the inferior commissure of the vulva. Two more sutures were placed midway between the upper and lower sutures. Strong bandage material was passed through the loops in both horizontal and diagonal directions. The lips of the vulva were pulled together with the bandage material and tied to prevent any tissue from being forced out between the horizontal strips. By this method of suturing, injury to the vulva is avoided. Also the tapes may be removed and replaced without difficulty.

Vaginal examinations were made regularly for 13 days at which time the operation was repeated in a similar manner to remove a small portion of proliferative tissue that had been missed in the first operation. The vulva was relaced to prevent further prolapse.

Five days following the second operation an examination revealed a slight purulent exudate in the vagina. Bipp was introduced with a cotton swab.

The following eight days bipp, sulfanilamide powder, pyoktannin blue and aromatic chlorazene were used alternately. The aromatic chlorazene was administered in a 1% solution as a vaginal douche. Each day the tapes were replaced across the lips of the vulva following treatment. By this time the swollen part of the vagina would not prolapse farther than the lips of the vulva when the animal was in sternal recumbency.

Thirteen days following the second operation the animal was sent home. The suture loops, lateral to the lips of the vulva, were left in place and the owner was advised to replace the tape if the vagina prolapsed beyond the lips of the vulva when the animal was lying down.

The appearance of this partial prolapse following the second operation was largely due to the high condition of the animal and to some swelling still remaining at the site of the operation.

It was thought as soon as the inflammation from the operation subsided completely and with the contraction of cicatrical tissue forms, this condition would terminate.

H. H. BERRIER, JR.

Odessa, Missouri

Abstracts

Rickettsiosis Unaffected by Chemotherapy

The conquests of the sulfa drugs and penicillin in the field of human and animal disease are so numerous that it is news when they fail to influence the course of a disease. Rocky Mountain spotted fever is one such disease. In tests on guinea pigs, which are susceptible to the disease, sulfapyridine, prontosil, sulfamerazine, sulfadiazine and sulfathiazole proved wholly ineffective in influencing the course of experimentally induced spotted fever. Penicillin[90] not only failed against the disease but hastened death of the experimental animals. Rabbit globulins were of marked value in decreasing the severity of the attack and reducing the mortality.

* * * *

Energy Requirements of Foxes and Mink

In a preliminary report Hodson and Smith,[7] from data derived from an investigation conducted at the Laboratory of Animal Nutrition, Cornell University, give the daily food energy requirements of foxes as 78 to 180 calories per kilogram, body weight (35 to 82 calories per pound), and for mink, 208 to 324 calories per kilogram, body weight (95 to 147 calories per pound). The average daily energy requirement of the five foxes used in the test was 120 calories per kilogram, body weight (55 calories per pound) and for the five mink used in the test, 273 calories per kilogram (124 calories per pound).

Since the fur industry is interested, not in the body weight but in the surface of fur animals they regard a calculation of energy requirements per square meter of body surface as more appropriate than on a basis of body weight. On this basis the average daily energy requirement of foxes is 2102 calories (range 1082 to 2640) and of minks 2370 (range 1950 to 2610).

According to the table given by the authors the calories per pound of horse meat varies from 500 to 2345; in fish the variation is from 335 to 1135; in cereals from 1630 to 1850 and in vegetables from 90 (lettuce) to 385 (potato).

The authors remind readers that these figures refer to maintenance diet, that for growth, pregnancy, lactation, even rapid growth of fur, the requirements are higher. Also, that the energy content of feeds is significantly influenced by the water content; and further meats high in fat are a much better source of energy than meats low in fat.

Thus to meet the average daily energy requirement of a two-pound mink it takes four ounces of fat horse meat, 5.5 ounces of average horse meat and 6.3 ounces of lean horse meat.

Since only a few animals were used in the feeding trial and the period was short, it is stated the report should be regarded as a preliminary one.

* * * *

Laboratory Diagnosis and Laboratory Aid to Diagnosis

Roberts[8] deplores the fact that the powers of observation of the average medical graduate are relatively undeveloped and suggests that three factors are responsible for this, *viz*, the method of teaching, laboratory methods of diagnosis, and the text-books. He suggests that the present method of clinical teaching may lead many students to acquire an inferiority complex. The taking of clinical notes, he states, is rightly regarded as important, but it may be dangerous since notes may be written automatically, without the facts being impressed upon the memory. A student may also acquire the habit of recording observations in a way which, while not entirely accurate, does not leave him open to criticism.

Laboratory methods are blamed for an atrophy of the senses, since many adopt the use of these aids as a substitute for clinical observation rather than as an additional aid. The standard text-books used in the preclinical and clinical periods of the course, have increased by over 1,000 pages in each case since the period 1907-12. This increase adds considerably to the mental burden of the student. The author suggests that the large books should be used only for purposes of reference and that the acquisition of large masses of factual knowledge dulls the imagination and deadens the curiosity and initiative of the student.

As a solution to the problem, the author suggests a complete revolution in clinical medical training, so as to stimulate the student's interest and develop his powers of observation. He suggests that the student should be put through a rigorous discipline in accurate observation and in giving an account of his observations without the aid of notes. With emphasis laid on observation, the student would learn to see laboratory methods in their proper perspective as aids to clinical diagnosis.

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[90] Kirkpatrick, Florence K., Penicillin in experimental spotted fever. *Sci.*, 102:2639, p. 96. 1945.

[7] Hodson, A. Z., and Smith, S. E. Estimated maintenance energy requirement of foxes and mink. *Am. Fur Breeder*, 18:4, pp. 44-52. 1945.

[8] Roberts, F. Observations in the student's training. *Brit. Med. J.*, Aug., 1944. Abst. in *Vet. Bul.*, 15:6. 1945.

Use of Penicillin in Mastitis

In a preliminary report on the treatment of mastitis in cows Schalm[1] recommends:

1. The infusion of 20,000 units of penicillin, dissolved in 50cc of sterile distilled water, per infected quarter at milking intervals until five infusions have been given.

2. In cows producing more than 50 pounds of milk per day it may be desirable to increase the dose to 50,000 units because of the dilution caused by the large flow of milk.

3. Inject the penicillin through the teat orifice immediately after milking.

"Penicillin is the most satisfactory agent thus far studied for the treatment of mastitis. It is almost completely nonirritating to mammary tissue, yet is highly effective against *Streptococcus agalactiae*, the most frequent cause of this disease. Penicillin can be used on the lactating udder without danger of lowering milk production.

History of the Human-Bovine Brucellosis Relationship

It was from the work of Cotton and Schroeder, at the laboratory of the United States Bureau of Animal Industry at Beltsville, Md., during the first decade of the century, that the present knowledge of brucellosis sprang.[3] Then and there the organism of Professor Bang (1896) and *Micrococcus melitensis* of Sir David Bruce (1887) were first suspected of being related. Alice Evans of the same bureau clinched the relationship in 1918 and Nicolle and Brunett in Tunisia in 1923. The researches of Alice Evans during the 1920's stands out in the literature because it was exact beyond reproach. That is, by 1927, undulant fever of man was found to occur from organism of Bang in cows independent of any possible contact with the organism of Bruce in goats. The isolation of *Brucella suis* by Traum, also of the B.A.I., figures in the climactic finding along with researches dating back to 1907; Vincent, 1907-1923; Cotton and Schroeder, 1910; Widel, 1910-1911; Weil and Menard, 1912; Traum, 1914, Coolidge, 1916; Nicolle and Burnett, 1923; Hardy, 1929; and others in Britain, Germany and the United States. For the pattern of brucellosis control around the world, the credit goes to Alice Evans while working with Cotton and Schroeder who developed strain 19 vaccine. These were primary discoveries in the control of brucellosis just as the historic discoveries of Bruce and Bang were primary in its etiology. Pertinent facts to remember in veterinary medicine are the isolation of the organisms above mentioned in the later part of the nineteenth century, the observation of Cotton and Schroeder (1910) that infected cows shed the organism in their milk for long periods. Alice Evan's discovery of the undulant fever and infectious abortion relationship (1918-1927) [the bacteriological studies of Huddleson (1930's), the immunizing power of the attenuated strain and the announcement of Mohler in 1940 that critical trials showed that strain 19 may be used with good effect in the control of the disease in cattle*]. The work of Hardy of the public health service of Iowa and extensive investigation of the U. S. Public Health Service figure prominently in world's knowledge of the brucellosis situation of the present time. In short, the campaign against brucellosis in farm animals has a sound scientific basis established by long painstaking work in the field of veterinary-medical research. If eradication lags, the fault will be in application, not in any dereliction of science.

Veterinary Achievements in Public Health

An important article by Harden[4] discusses a number of outstanding contributions of veterinary medicine to the prevention and control of disease in man.

The primary concern of veterinary medicine was the prevention of famine in the human population, due to diseases of animals. The conservation of the human food supply is still the greatest contribution of veterinary science to human welfare. The control of these diseases which destroyed man's food and robbed him of the means of tilling his soil soon led to the realization that some of these diseases could be transmitted to man. Thus man's health was added to man's food as a concern of the veterinary profession.

Many of the discoveries of human medicine are applied by the veterinarian in his field, but the reverse is as often the case. Some of the discoveries made by veterinarians in animal disease research have been of inestimable value in human medicine. Achievements of this nature discussed by the author include:

The research on Texas fever by Kilborne and Smith which contributed the background work for the conquest of yellow fever.

The conquest of bovine tuberculosis, which

[1] Schalm, O. W., University of California, Berkeley. Recommendations for the use of penicillin in the treatment of bovine Mastitis. Mimeographed report.

[3] Netter, Sur la fievre ondulate d'origine bovine (undulant fever of bovine origin), Rapport a l'Academie de médécine, Feb. 24, 1931, abstracted in *Rec. de Méd. Vét.*, 107, pp. 285-299, 1931.

*This sentence is interpolated to bring the preceding statement to date.

[4] Harden, Florence. Some contributions of veterinary medicine to public health. *Bul. Med. Libr. Assn.*, 33:4, pp. 482-490, 1945.

has not only removed an important source of infection of man but has demonstrated to human medicine, methods for the control of tuberculosis much superior to any it had used or known. Dr. J. A. Myers, a leading authority on human tuberculosis, has stated: "Human medicine is 40 years behind veterinary medicine in the tuberculosis control program."

It is surmised that possibly 10% of the population suffer undiagnosed infections of undulant fever and there is little prospect of controlling the disease in man except as it can be brought under control in cattle and swine by veterinarians. In areas where brucellosis has been eliminated from animals an important contribution to its prevention in man has been made.

The virus origin of equine encephalomyelitis, an animal disease communicable to man, was established by Meyer, Haring and Howitt—veterinarians. Veterinarians also determined the role of the mosquito in the transmission of the disease. By exercising a large measure of control of encephalomyelitis in horses, veterinarians have diminished greatly the possible human contacts with the virus.

Anthrax was formerly a common disease in man. Animals were the source of his infection. By bringing the disease under almost complete control in animals, veterinarians have made anthrax a rare affliction in man. Glanders, formerly by no means an unknown disease in man, has been completely eliminated by its eradication in horses, through the vigilence of veterinarians.

Influenza of man, horses, swine, dogs (distemper) and ferrets has strikingly analogous syndromes in the several species, and has been the subject of research in each. So far, greater progress has been made in animals (swine and dogs) than in man. It is probable that further research on the influenzas of animals will contribute still more to the study of the disease in man.

The study of rabies has developed effective measures for its eradication. Notwithstanding the terror in which the disease is held by the public generally, these eradication measures have not received the support their demonstrated success demands.

A veterinarian in an American laboratory developed a specific serum for *Erysipelothrix rhusiopathiae* infection of swine and man. A French veterinarian discovered toxoid which is the basis of immunization in such disease as tetanus and diphtheria. The use of carbon tetrachloride and tetrachlorethylene for ancylostomiasis originated in the search of a veterinarian for a remedy for hookworm in dogs. Discovery of the cause of sweet clover poisoning in cattle led the way to the prevention of fatal postoperative embolisms and other thromboses in man.

During the war when our armies occupied enemy territory, veterinary officers immediately took over the task of (1) controlling in the area the diseases of animals that are transmissible to man, (2) inspection of food animals and of foods of animal origin and (3) maintenance of the health of work animals.

The author closes the discussion with the following paragraph:

"The list of veterinary contributions to public health could be expanded indefinitely. However, the foregoing discussion has given a glimpse of the broad field of veterinary medicine and its many points touching on human medical science. Brumley stated: 'Public health is not a science standing alone in isolated grandeur. Rather it is a coöperating and coördinating focus, at which meet all those sciences which may assist in surrounding man with every safeguard which may protect and prolong life.' In this coördination of the sciences for the benefit of man, veterinary medicine has had a proud and noble part."

Salt Poisoning in Sheep

Reports of salt poisoning in sheep in this country are rare and the belief widely prevails that this animal will not eat sufficient salt under any circumstances to harm it seriously. There is probably a sound basis for this.

In Australia, however, salt poisoning in sheep occurs not infrequently. There sheep are often watered from artesian wells, the water from which contains salt. A sodium chloride content up to 400 grains per gallon is regarded as not being harmful for sheep. Moule[97] reports the death of 62 of a band of 3000 sheep from a single watering from a well the outflow from which contained 420 grains of sodium chloride per gallon. Investigation after loss of the sheep disclosed the salt content of the storage tank to be 1.5 ounces per gallon and of the trough which conveyed the water from the well to the tank to be nearly four ounces per gallon. Evaporation accounted for the stepped-up salt content.

In view of the opportunity of farm flocks to gain access to brine the symptoms and lesions of salt poisoning in sheep are worth remembering. Moule reports them as follows:

"The sick animals showed scouring, staggering gait suggestive of marked weakness, muscular spasms, twitching and struggling when down, possibly indicating abdominal pain.

"The main lesion was of gastroenteritis."

[97] Moule, G. R. Salt poisoning in sheep following evaporation of saline waters. *Austral. Vet. J.*, 21:2, p. 37. 1945.

Spontaneous Allergy in a Dog

Positive reactions to several foods and to house dust were obtained by direct and indirect skin testing in a dog that suffered perennial nasal allergy and eczema.[9] Two hours after the direct tests were performed, the animal developed pruritus, erythema and a reactivation of the eczematous lesions. Tachycardia, dyspnea and oliguria also occurred and lasted 24 hours. The administration of epinephrine stopped the reaction. The elimination of suspected foods cleared all symptoms.—*H. J. M.*

Distemper in Mink

Distemper is a serious and costly disease on mink ranches.[11] Uncontrolled, an outbreak may kill up to 80% of the animals on a ranch. It is due to the same filterable virus that causes distemper in dogs, foxes, coyotes, skunks, raccoons, ferrets and some other more or less nearly related animals. As is the case in other animals, the virus in mink develops a high pathogenicity for that animal and lesser virulence for related species.

The disease may be introduced on a mink ranch by newly purchased mink, by dogs, foxes and the various susceptible wild animals. The symptoms are similar to those in the dog or fox suffering from the same disease, except that skin lesions are more pronounced and in some outbreaks a greater percentage of minks have convulsions. About the eighth day in the course of the disease a distinct rash appears on the mandible and on the feet and often on the abdomen. This rash may extend over the whole body. During the second week of illness the foot pads may become scaly and, in some cases, enlarged to several times their normal size.

A typical outbreak of distemper on a mink ranch is readily diagnosed clinically but, at times, when the infection is introduced by a different species, the disease is so mild in the beginning as to make clinical diagnosis uncertain. In such cases, smears from the lungs and bladder should be examined microscopically for the characteristic inclusion bodies. In occasional cases miscroscopic sections may have to be made in order to find the inclusion bodies.

The treatment of distemper in mink is unsatisfactory and it is usually impractical to stop an outbreak by means of disinfection and quarantine until it has affected all susceptible animals on the ranch. However, vaccinating all but the obviously sick animals with formolized tissue vaccine, containing the killed virus and at the same time giving antiserum will usually suppress an outbreak in about three weeks. The saving in mink will depend upon the promptness with which a diagnosis is made and the vaccination performed and the virulence of the invading virus. Saving 50% of the animals should be considered good results.

The formolized tissue vaccine is a highly effective agent for prevention of distemper and a great boon to the mink industry. By vaccinating kits at eight to ten weeks of age they can be rendered immune for 6 to 8 months. Breeding minks should be revaccinated eight to ten weeks before mating. The kits should be given two 1cc doses of the vaccine with an interval of seven to 10 days. A single, 2cc, booster dose is adequate for the breeding mink. Where the vaccine is used in an outbreak of the disease, three doses at five-day intervals should be given and results are improved by giving 5 to 10cc of antiserum at the same time the first dose of vaccine is given. However, the author cautions that where a virulent strain of virus invades a ranch where the animals are crowded that practically all animals on the ranch may be infected before the vaccine has time to afford protection and in such cases the loss will be very high.

Vitamin A Potency of Ohio Butter

A survey[10] of Ohio creamery butter made in 1943, 1944 and 1945 showed an average May to November vitamin A potency of 15,494 I.U. per pound and a December to April potency of 10,360 I.U. Weighted for the greater production (65%) in summer this gives an average for the year of 13,883 I.U. per pound. To arrive at the vitamin A potency both the vitamin A content and the carotene content were computed.

The vitamin A potency varied from less than 9000 I.U. in January, February and March to more than 16,000 units in July and September or, according to amount of carotene available to the cows in their forage ration. This varied widely between pastures and cured forage. The vitamin A in the butter increased very rapidly when the animals went on pasture in May but decreased slowly on dry forage in the fall. This slow decrease, of course, is due to storage of vitamin A by the animal while on pasture.

There was no significant loss of vitamin A in butter stored at 0° F. for 12 months and but little loss of carotene.

The results of the Ohio survey vary but little from those of the national survey made during the same period.

[9] Moreno, G. D., and Bentolila L. Report of a case of spontaneous animal allergy. *Ann. Allergy*, 1, p. 65. 1945.

[11] Green, Robert G. Distemper and its control in mink. *Am. Fur Breeder*, 18:4, pp. 8-12. 1945.

[10] *Bimonthly Bul.*, 30:236, Ohio Agr. Exp. Station.

Lactations Induced by Synthetic Estrogens

Spriggs[9] records observations on 13 heifers and six dry cows in six of which he had implanted varying doses of diethylstilbestrol and in the remaining 13, hexestrol. The group included two animals with white heifer disease which were, of course, permanently sterile. Sixteen of the group were infertile and one, although dry nine months, had not been mated. Except for the two cases of white heifer disease, the genital organs of all the animals were normal to detailed clinical examination. All were members of commercial dairy herds; were privately owned and were of fair to good dairy type.

Four animals, including a case of white heifer disease failed to develop lactation; three produced so little milk as to be practical failures. Economical production was attained in ten of the remaining eleven. They produced from 20 to 30 pounds of milk daily at the peak of production and a total of 3000 to 7000 pounds up to the time the experiment was discontinued (one year). At that time seven of the 11 were still producing. The remaining heifer produced a maximum of 15 pounds daily and a total of 2893 pounds in 273 days.

The implanted estrogen was allowed to remain in the tissues from 53 to 115 days and then the unabsorbed portion was removed surgically. While the implantation remained the animals suffered atypical nymphomania and lost weight. After removal of the implanted estrogen the animals quieted, produced more milk and gained in flesh.

The results from the implantation of diethylstilbestrol dipropionate were better than for hexestrol. The author recommends a dose of 50, 50mg tablets implanted subcutaneously all in one place just back of the shoulder and that the unabsorbed tablets be removed not later than 60 days. Lactation began in three to five weeks after implantation, increased to a maximum in another five weeks and continued uniform for four months after which production slowly decreased. The milk flow was affected by changes in the ration just as in a normal lactation. It is the author's opinion that but for the shortage of feed and a consequent rather low plane of nutrition in the herds to which these animals belonged production would have been better.

It was several weeks to several months after the implantation was removed before normal estrus cycles were established and even when they were established only four of the 17 conceived or, omitting the animal not known to be infertile previously, only three of the 16 infertile animals—and one of them aborted at three months.

The procedure is not regarded as economically sound in permanently sterile heifers—white heifer disease, free martins—nor commendable in dry cows with poor breeding records. "If, however, the process can be shown to restore the impaired fertility in slow-breeding heifers, there will always be a limited demand for its use on high quality purebred cattle. In our present state of knowledge such an optimistic attitude can hardly be fully justified."

[9] Spriggs, D. N. Some observations on the estrogenic induction of location in cattle. *Vet. Rec.*, 57:47, pp. 519-525. 1945.

* * * *

Useful Bulletins, Circulars, Etc.

Artificial Insemination of Dairy Cows.—Bul. 641, Ohio Agr. Exp. Sta., Wooster.

Studies of Semen and Semen Production.—Tech Bul. 162, Minnesota Agr. Exp. Sta., University Farm, St. Paul.

D.D.T. and Its Uses.—Technical bulletin. TB Med. 194, War Department, Washington D. C. Price 15 cents.

Weight Loss in Dressing Fish. Article 27-20; reprint from *Quar. Bul.* Michigan Agr. Exp. Sta., East Lansing.

National Turkey Improvement Plan—Misc. Pub. No. 555, U. S. Dept. of Agr., Washington 25, D. C.

Simple scoring System for Estimating Meat Type of Live Poultry. Article 28-10, Michigan Agr. Exp. Sta., East Lansing.

The Colony Hog House. Complete plans and specifications for building are given. Ext. Ser. Wisconsin Col. of Agr., Madison.

Better Dairy Calves.—Care, housing, feeding and rations for the dairy calf. Cir. 359, Ext. Ser. Wisconsin Univ. College of Agr., Madison.

Leucemia in Dogs.—Malignant Lymphoma (so-called leucemia) in dogs. Reprint from *Am. J. Path.* Frank Bloom, D.V.M., Flushing, L. I., N. Y.

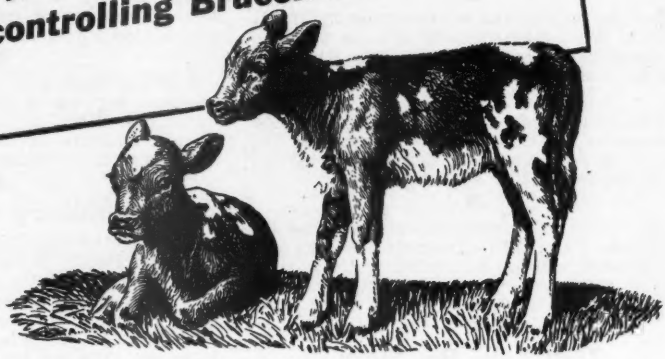
Laying Houses for the Modern Hen.—Functional requirements in designing laying houses for poultry Circ. 738, Office of Information, U. S. Dept. Agr., Washington 25, D. C.

Descent of Property.—Planning for the descent of property in the family. Gives general principles of family inheritance. Extension Cir. 364, University of Wisconsin, Madison.

Mink Raising.—A 32-page bulletin which deals with the breeding, feeding, housing, pelting and other matters concerned with mink raising. Wisconsin Conservation Dept., Madison.

Some Plants Poisonous to Livestock in Oklahoma. A non-technical description of 11 poisonous plants common in pastures and on the range, with excellent illustrations of each. The plants are widely distributed in other states also. In addition to the plants recognized generally as being poisonous, the oak is given as sometimes causing poisoning in cattle. No instances are cited to support this controversial listing of the oak as poisonous. Cir. No. C-118, Oklahoma Agr. Exp. Sta., Stillwater.

Establishing a resistant herd by calfhood vaccination is economically the most practical method of controlling Brucellosis



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The veterinary needs of a large dairy herd of registered Holsteins at Eleuthera, Bahama Islands, are cared for by Dr. D. W. Jensen of Jacksonville, Florida.

■

Dogdom's man and woman of the year, according to balloting conducted by Gaines Research Center, are Lawrence A. Horswell and Mrs. Milton Erlanger.

■

Caffiene is soon to be produced synthetically in large quantities by a huge plant to be constructed by the Monsanto Chemical Company of St. Louis.

■

That there is just one veterinarian to 25,000 animals or to 625 livestock owners in the United States, has been determined by the U. S. Department of Agriculture.

■

The Upjohn Company, Kalamazoo, has recently purchased 500 acres near that city and will expand facilities for manufacture of antibiotics. Streptomycin will be put into large scale production when the plant is finished.

■

That Tells the Story

An excited Irish maid of all work, as she ascended the basement stairs, said to her mistress:

"Shure, mum, two rats were killed in the cellar last night."

"How do you know?" asked the mistress.

"Shure, there was the head of one and the tail of another!"—*Anonymous.*

■

Analyses of Station herd milk production for carotene and vitmain A content from October to April are reported by Louisiana Station Bulletin 388. It varied from 1,280 I. U. per quart in January to 2,805 I. U. in April. Grazing the herd on fall-sown oats in winter and early spring raised the A vitamin level an average of 440 I. U. per month and up to 780 extra units in December, accompanied by more milk flow and better herd health.—*Hoard's Dairyman.*

■

Outstanding Dog of '45

Quo Shmerk von Marienland, male Doberman Pinscher owned by Rupprechtheim Kennels, Indianapolis, Ind., was voted America's outstanding dog of 1945 in the second annual nation-wide poll of licensed all-breed and group judges conducted by the Gaines Dog Research Center, New York.

Runners up in the balloting—each with only one vote behind Quo Shmerk—were Mighty Sweet Regardless, female Boston terrier owned by Claude J. Fitzgerald, Wyandotte, Mich.; Herewithem General Mac, male pointer owned by Robert F. Maloney, Pittsburgh, Pa.; Rudiki of Prides Hill, male Afghan, international champion owned by Mr. and Mrs. Harry Florsheim, New York City, and Sirarno's Impertinent Lady, female Kerry blue owned by Sirarno Kennels, Burbank, Calif.

More than six million pupils are provided with hot lunches daily in schools throughout the country.

■

The meat packing industry produced 147,246,000,000 pounds of meat during World War II.

■

In a poll conducted by *Successful Farming* magazine 68% of all farmers approved one year of military or naval training for every able bodied young man.

■

A new chigger and mosquito repellent, 612, has been announced by a scientist of Rutgers University. When applied to the clothing 612 is most effective as a chigger repellent—the effect lasts for several days.

■

Military Medicine

"Despite the fact that United States troops lived and fought in some of the most disease-infested areas of the world, the death rate from non-battle causes in the Army in the last two years was approximately that of the corresponding age group in civil life—about three per 1,000 per year. The greater exposure of troops was counter-balanced by the general immunization from such diseases as typhoid, typhus, cholera, tetanus, smallpox, and yellow fever and, obviously, by the fact that men in the Army were selected for their physical fitness.

"The comparison of the non-battle death rate in this and other wars is impressive. During the Mexican War, 10% of officers and enlisted men died each year of disease; the rate was reduced to 7.2% of Union troops in the Civil War; to 1.6% in the Spanish War and the Philippine Insurrection; to 1.3% in World War I; and to 0.6% of the troops in this war.

"Insect-borne disease had a great influence on the course of operations throughout military history. Our campaigns on the remote Pacific Islands would have been far more difficult than they were except for the most rigid sanitary discipline and the development of highly effective insecticides and repellents. The most powerful weapon against disease-bearing lice, mosquitoes, flies, fleas and other insects was DDT. In December, 1943, and early 1944, a serious typhus epidemic developed in Naples. The incidence reached 50 cases a day. DDT dusting stations were set up and by March more than a million and a quarter persons had been processed through them. These measures and an extensive vaccination program brought the epidemic under control within a month. Shortly after the invasion of Saipan an epidemic of dengue fever developed among the troops. After extensive aerial spraying of DDT in mosquito-breeding areas, the number of new cases a day fell more than 80% in two weeks. The danger of scrub typhus in the Pacific Islands and in Burma and China was reduced measurably by the impregnation of clothing with dimethyl phthalate."—*Report of the Surgeon General.*